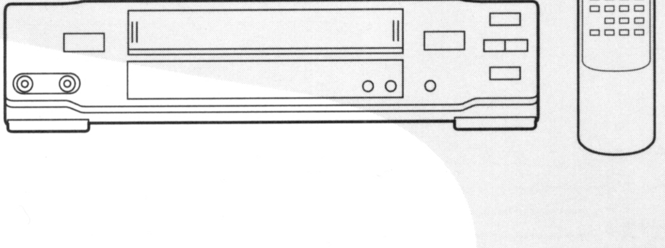
TOSHIBA

FILE NO. 110-9525

SERVICE MANUAL

VIDEO CASSETTE RECORDER

V-405W



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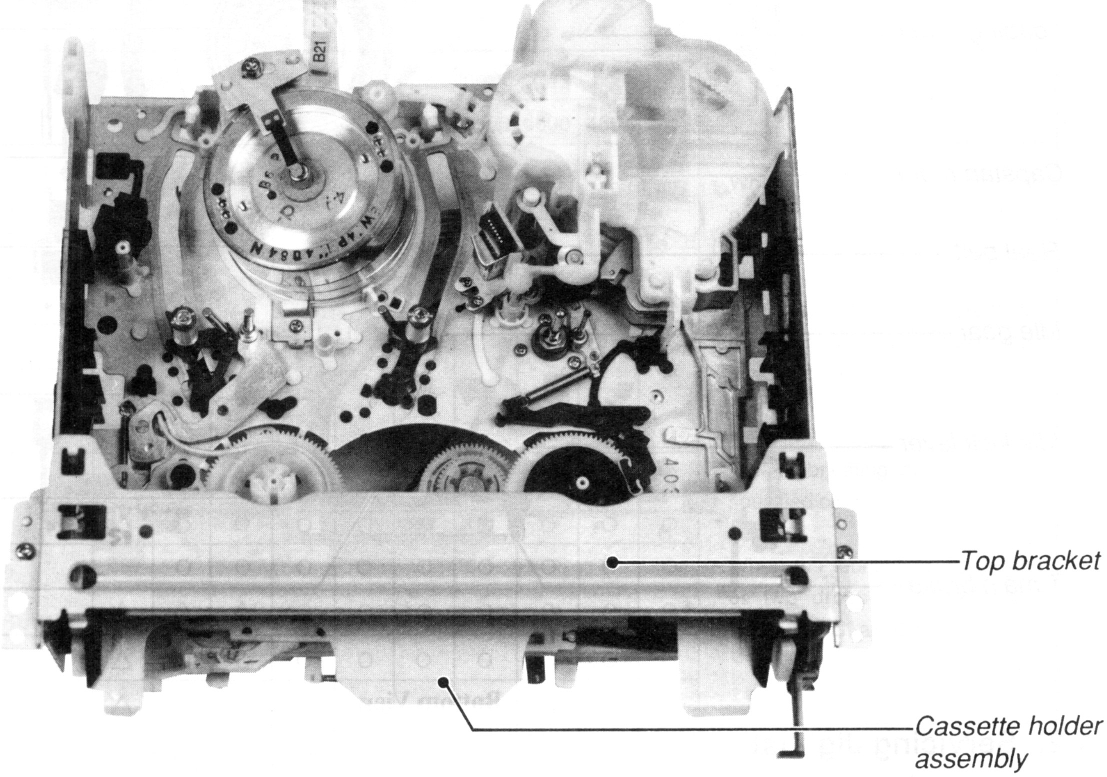
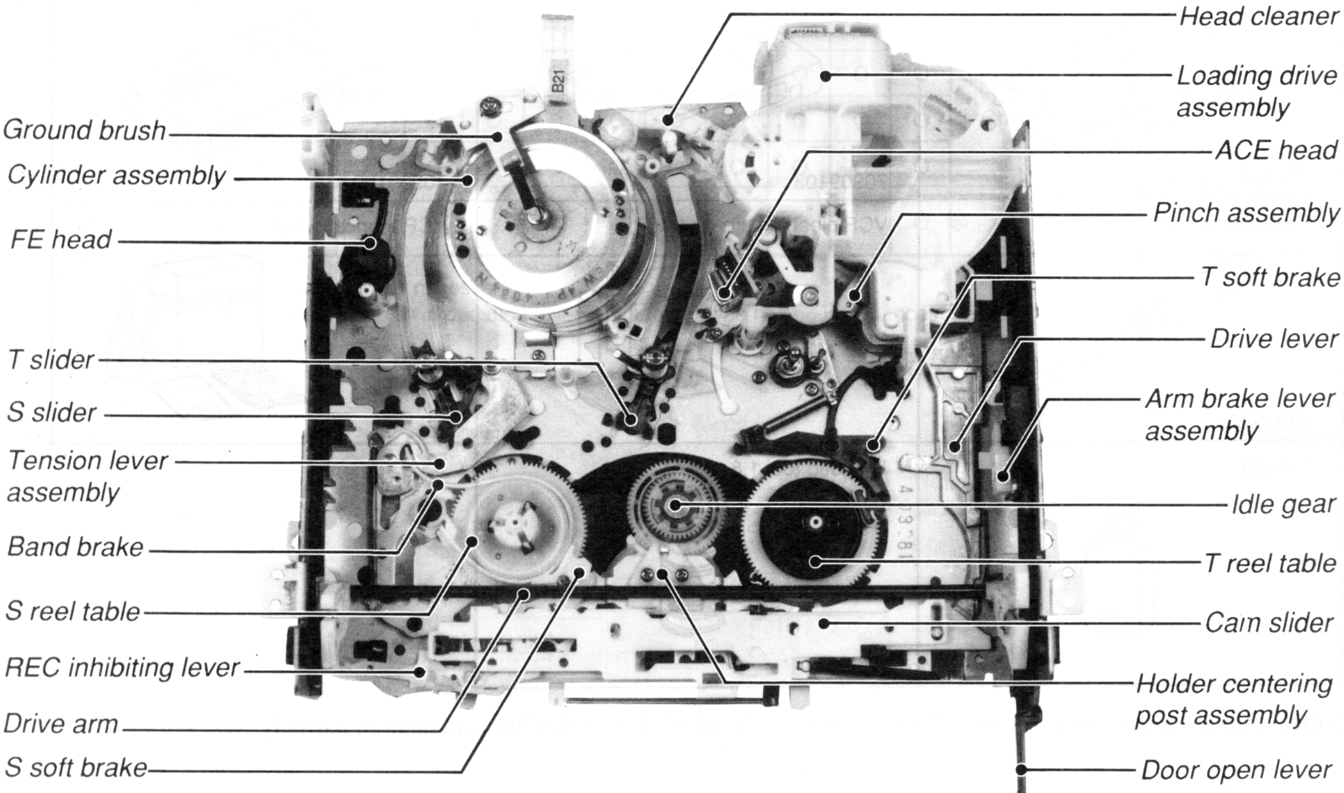
SECTION 2
ADJUSTMENT PROCEDURES

1. MECHANICAL ADJUSTMENT

1-1. Mechanical Parts Location

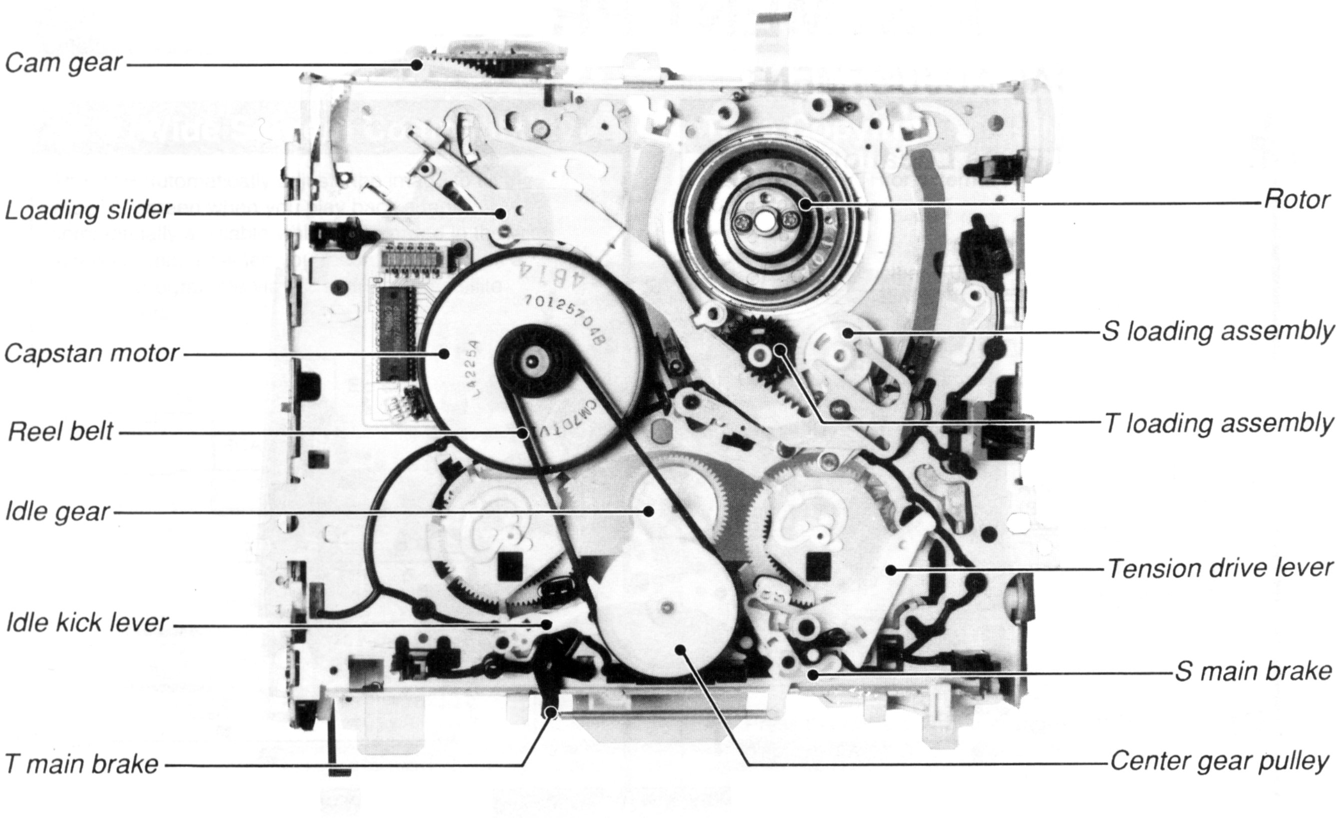


Top bracket
Cassette holder assembly



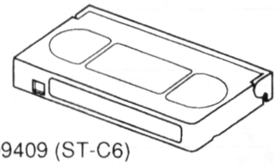
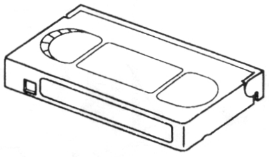
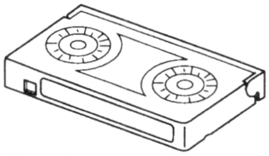
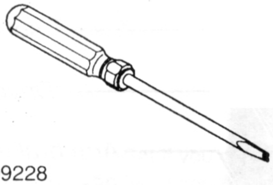
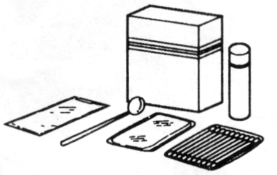
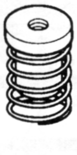
Head cleaner
Loading drive assembly
Ground brush
ACE head
Cylinder assembly
Pinch assembly
FE head
T soft brake
Drive lever
T slider
Arm brake lever assembly
S slider
Tension lever assembly
Idle gear
Band brake
T reel table
S reel table
Cam slider
REC inhibiting lever
Holder centering post assembly
Drive arm
S soft brake
Door open lever

Top View


Cam gear
Loading slider
Capstan motor
Reel belt
Idle gear
Idle kick lever
T main brake
Rotor
S loading assembly
T loading assembly
Tension drive lever
S main brake
Center gear pulley

Bottom View

1-2. Servicing Jig List

Alignment tape  70909409 (ST-C6) 70909410 (ST-C7)	Back tension cassette gauge  70909103	Torque cassette gauge (KT-300NR)  70909199
Taper nut driver  70909228	VCR cleaning kit  	VCR lubrication kit
Grease 	Pre-load tool 1.8  70909416	

Note: Conventional alignment tapes ST-C1 (70909227) and ST-C3 (70909264) can be used partially.

1-3. Main Parts Servicing Time

- Part replacement time differs from servicing life time of each part.
- Following table is prepared based on a standard condition (room temperature, room humidity). The replacement time will be varied depending upon operation environment, using methods, operation duty, etc.
- Particularly, life of the upper cylinder depends upon operation conditions.

	Part Name	Service time (Operating Hours)										Note
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Tape Transport System	Tension post	△	△	△	△	△	△	△	△	△	△	• When cleaning, use a swab or piece of gauze soaked in alcohol. • After cleaning, cleaned parts are dried comepletely, and then load a video cassette.
	S/T slant guide post											
	Impedance roller *											
	No. 8 guide post											
	Capstan											
	No. 9 guide post											
	No. 3 guide post											
	S/T guide roller	△	△	△	O	O	O	O	O	O	O	• When lubricating, always use the specified oil. • When the lubricating, apply one or two drops of oil after the cleaning with alcohol.
	Upper cylinder	△	O	O	O	O	O	O	O	O	O	
	Slip ring assembly		O	O	O	O	O	O	O	O	O	
	FE head	△	△	△	O	O	O	O	O	O	O	
	ACE head	△	O	O	O	O	O	O	O	O	O	
	Pinch roller	△	O	O	O	O	O	O	O	O	O	
Tape Drive System	Capstan motor	△	△	△	△	△	O	O	O	O	O	
	Loading motor				O	O	O	O	O	O	O	
	Loading belt/ Reel belt	△	O	O	O	O	O	O	O	O	O	
	S reel table assembly		O	O	O	O	O	O	O	O	O	
	T reel table assembly		O	O	O	O	O	O	O	O	O	• Check the back tension.
	Idle gear assembly	△	O	O	O	O	O	O	O	O	O	
Other	Band brake assembly		O		O		O		O		O	

△ : Cleaning O : Check and replace if necessary

⋆ There are two types. One type has an impedance roller and another type has no impedance roller.

1-4. V3 Mechanism Check Method

If the abnormal condition is caused by the mechanism itself, analyze the cause according to the following procedures.

1-4-1. External Appearance Check

(1) Check whether there are foreign matters or not inside the VTR.

(2) Check whether the cylinder and the guides for tape transport system are contaminated.

1-4-2. Motor Sensor System Check

Check whether some abnormalities are found in the motor or the sensor system (including control circuits) according to the flow chart.

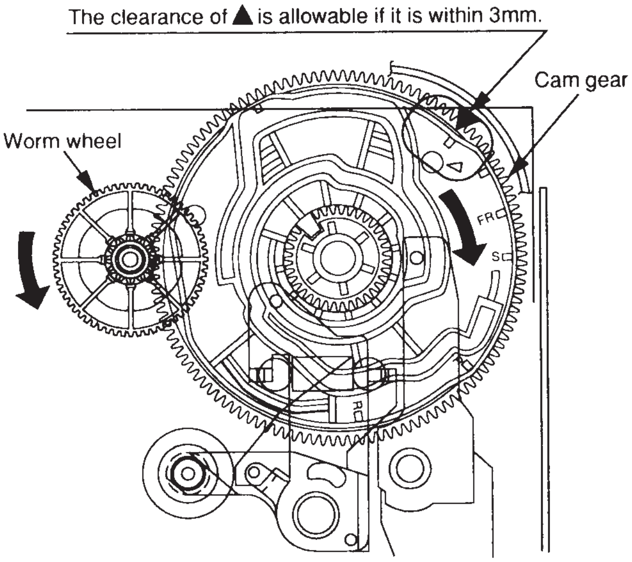
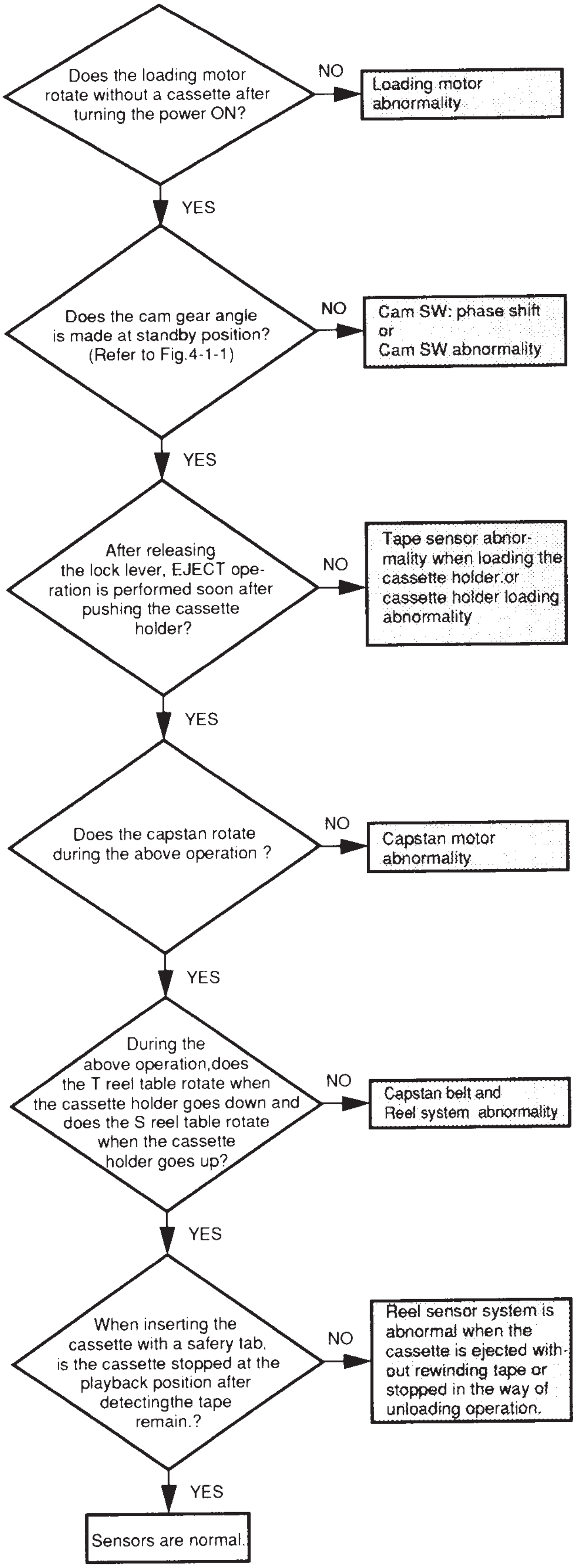

The clearance of ▲ is allowable if it is within 3mm.
Cam gear
Worm wheel
FR
SC
RC

Fig. 4-1-1


Does the loading motor rotate without a cassette after turning the power ON?
NO
Loading motor abnormality
YES
Does the cam gear angle is made at standby position? (Refer to Fig.4-1-1)
NO
Cam SW: phase shift or Cam SW abnormality
YES
After releasing the lock lever, EJECT operation is performed soon after pushing the cassette holder?
NO
Tape sensor abnormality when loading the cassette holder or cassette holder loading abnormality
YES
Does the capstan rotate during the above operation ?
NO
Capstan motor abnormality
YES
During the above operation,does the T reel table rotate when the cassette holder goes down and does the S reel table rotate when the cassette holder goes up?
NO
Capstan belt and Reel system abnormality
YES
When inserting the cassette with a safery tab, is the cassette stopped at the playback position after detectingthe tape remain.?
NO
Reel sensor system is abnormal when the cassette is ejected without rewinding tape or stopped in the way of unloading operation.
YES
Sensors are normal.

1-4-3. Abnormality Analysis by Self-check Function

The unit used V3 mechanism has a self-check function. The self-check function works as a system which stored some abnormal condition. So, use this function to try to analyze the cause(s).

For the data display method and the content of the data, refer to the self-check function (described on page 2-50) in item 2-3.

Note:

- Abnormal data is displayed only when the first abnormal condition occurs, and is not displayed in the second time. Accordingly, the claim from customers and the actual data displayed may be different.
- The data is stored only when the power turns off after occurring the abnormality condition(s). The data is not stored when the unit operation is recovered by the microcomputer.
- After repairing, initialize the data by pressing the [COUNTER RESET] button while displaying the abnormal mode.

The typical examples in abnormal condition are shown below.

Table 4-3-1

A	B	C	Abnormal Condition	Check Item
06	01	09	Cylinder is stopped at playback position during playback the tape.	Check the cylinder motor. Check if the cylinder and tape transport guide are clogged.
02	01	0d	Cylinder is stopped at FF/REW position during rewind the tape.	
06	02	09	T reel sensor is abnormal at playback postion during playback the tape.	Check the capstan motor. Refer to the cases 2 and 3 describe on the table "Defective analyzing list".
03	03	07	S reel sensor is abnormal at playback position during REVIEW the tape.	
01	04	02	Cassette-in and out operation cannot be performed.	Refer to the case 1 described on the table "Defective analyzing list".
03	05	08	Mode shift cannot be performed during shifting to REVIEW.	

A: System control mode, B: Abnormality No., C: Mechanical position when an abnormality occurs.

1-4-4. Check by Defective Analyzing List

If the abnormality causes the mechanism abnormal condition, presume, confirm and treat the defective according to the "Defective analyzing list" in table 4-4-1.

(1) Manual mechanism operation (mode shift) method

Push in the lock lever R and L manually and turn the worm wheel counterclockwise as shown in Fig. 4-1-1. The cam gear is turned clockwise and the mode shifts to the direction where the loading operation can be performed. So, check the mechanism condition in the defective mechanism position when the abnormality occurs.

(2) Defective parts replacement

When a defective occurs due to the defective part(s) and the part(s) is replaced, take care the following items.

- Especially as for the mechanical parts requiring the phase alignment, take care of the part replacement **E.g.**. Assembling mode, phase alignment mark and etc.
- As for the part(s) requiring lubricant such as a specified amount of oil or grease, apply grease or oil according to the instructions and do not stick grease or oil to the portions without allowing to stick it (especially in removal and assembly).

(3) Check after treating the defective

After replacing a defective part and/or aligning a part, first check the mechanism operation manually and confirm that no problem occurs, and then mount the mechanical deck, turn the power ON and check the mechanism operation.

Note:

- After replacing the defective parts according to the procedure of the treatment method for the "damage and phase shift of mechanical part", check the operation of the mechanism again, since the same (or similar) defective problem may occur due to other serious cause (in mechanism or electrical circuit) when performing the actual total check with turning the power on.

Table 4-4-1 Defective Analyzing List

Case	Defective Phenomenon (Main Items)	Presumed Cause (Main Cause)	Check Method
1	Power does not turn on. Loading operation is defective. Mode shift operation is defective.	<General> Mechanical stops due to mechanical phase unmatching.	Check mode shift "Cassette out FF/REW position" can be performed when turning worm wheel.
	Loading operation is not performed.	Loading motor does not rotate. (Loading motor is defective or circuit is defective.)	Check loading motor whether it turns by the outer power supply (12.5V).
	Unloading operation is not performed.	S reel does not wind the tape.	Refer to case 3 in this table.
2	Playback operation is not performed. Playback operation is defective.	<General> Main brake is not released. (ON) T soft brake is not released. (ON) Idoler does not swing. Pinch does not press.	Check mechanical position.
		Capstan motor does not rotate. (Capstan motor is defective or circuit is defective.)	Check capstan motor.
	Playback picture does not appear. Video recording can not be performed.	<In case of no mechanical problem> Cylinder is defective. (Circuit is defective.)	Check cylinder assembly.
3	Playback interruption. Detective phenomenon during playback. Recording interruption.	Reel rotation detection is defective. (Sensor is defective. Circuit is defective.)	Check sensor output.
		Idler does not swing.	Check mechanical position.
		Reel belt is removed.	Check the reel belt is removed or not.
4	FF operation is not performed. FF operation is defective. REW operation is not performed. REW operation is defective. Others: REV/FF is not performed. Others: REV/FF is defective.	Main brake is not released. (ON) T soft brake is not released. (ON) Idler does not swing. Pinch is not released.	Check mechanical position.
		Capstan motor does not rotate. (Capstan motor is defective or circuit is defective.)	Check capstan motor.
5	REVIEW is not performed.	Main brake is not released. (ON) T soft brake is not actuated . Idler does not turn. Pinch does not press.	Check mechanical position.
		Capstan motor does not rotate. (Capstan motor is defective or circuit is defective.)	Check capstan motor.
6	Slot-in is not performed. Cassette can not be inserted.	<General> When the F/L is mounted on the mechanical deck,the position is not correct.	Check mechanical position.
7	Capstan servo does not work. Capstan servo is uneven. Tape speed is fast. Tape speed is slow. Tape speed is uneven. FG pulse is not output.	Capstan motor is defective.	Check capstan motor.
		ACE head control output is defective. (Circuit is defective.)	Check ACE head. Check CTL output.
8	Audio output does not come out. Audio output is small. Audio output variation is large. Audio output is uneven. Audio distortion. Audio noise. Others: Audio is defective.	ACE head is defective.	Check ACE head. Check CTL output.
		Tape transport adjustment is not defective.	Perform tape transport adjustment again after confirming tape transport condition.
		Hi-Fi head (cylinder) is defective. (Circuit is defective.)	Check cylinder. Check whether B+14V is supplied.

Treatment: If the mechanical is found out to be defective according to the procedures described above, perform the following treatment.
•Misassembling, mechanical phase mismatch ....Repair correctly.
•Parts defect, parts damage...................................Replace parts.
If the mechanical is found out not to be defective according to the procedures above, check the circuit(s).

1-5. Mechanical Deck Removal and Mounting

1-5-1. Mechanical Deck Removal

1. Remove five screws (2) mounting the top cover (1) and remove the top cover (1) sliding backward and lifting upward.
2. Remove two screws (4) securing the front panel (3).
3. Remove the FFC (7) connecting the main unit (5) and the KDB unit (6).

Note:

Be sure to remove the FFC on the KDB unit side.

4. Remove two screws (9) securing the power unit (8).
5. Remove three screws (11) securing the mechanical deck (10).
6. Remove the claw securing the main unit (5) and the terminal board (12).
7. Remove the mechanical deck (10) with the main unit (5) from the chassis lifting the terminal board (12) slightly and pulling the top bracket (13) upward.

Note:

When pulling the top bracket (13) upward, take care not to deform the reinforcement plate located below the F/L assembly.

8. Remove the lead wire connecting between the mechanical deck (10) and the main unit (5).
9. Turn over the mechanical deck (10).
10. Remove the reel belt (16) and one screw (17).
11. Remove four claws securing the mechanical deck (10) and the main unit (5), and then remove the main unit (5) pulling upward.

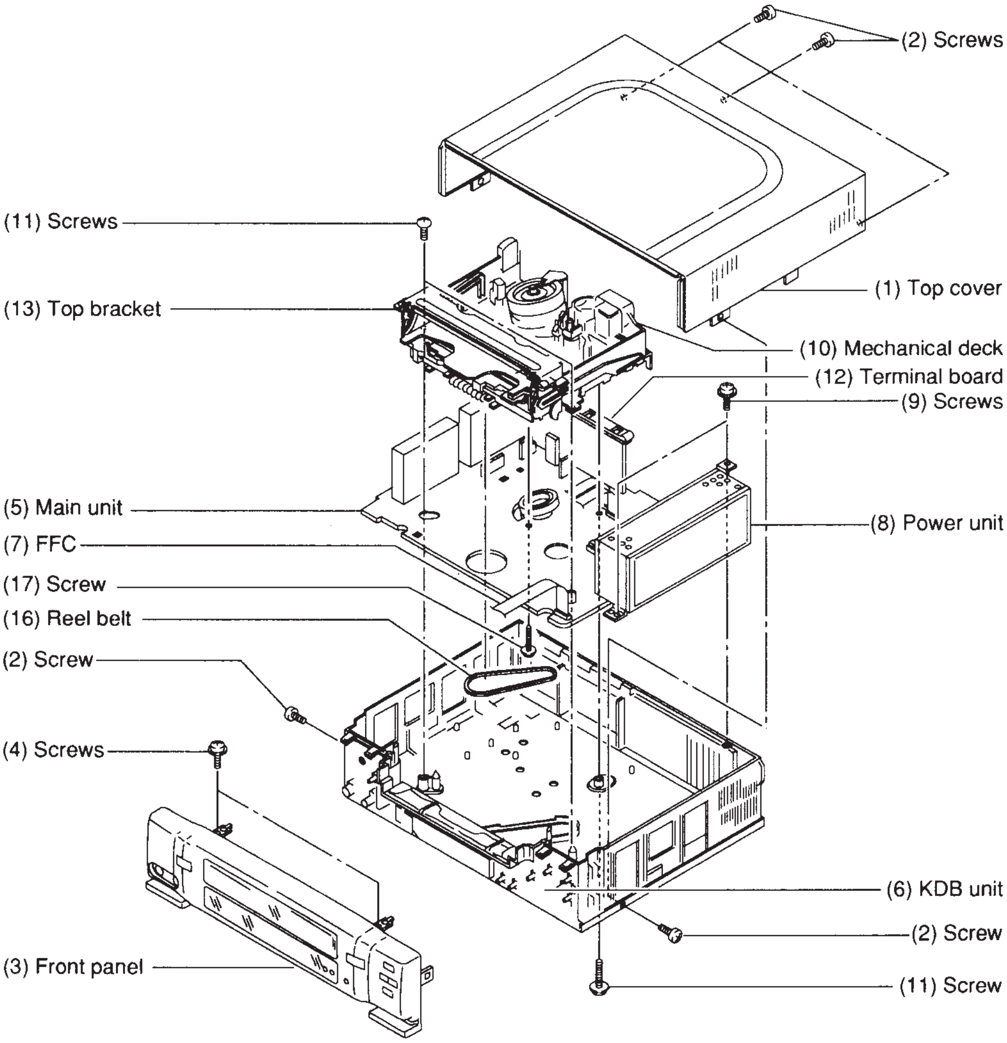

(2) Screws
(11) Screws
(13) Top bracket
(1) Top cover
(10) Mechanical deck
(12) Terminal board
(9) Screws
(5) Main unit
(8) Power unit
(7) FFC
(17) Screw
(16) Reel belt
(2) Screw
(4) Screws
(6) KDB unit
(2) Screw
(3) Front panel
(11) Screw

Fig. 5-1-1

1-5-2. Mechanical Deck Mounting

1. Turn over the mechanical deck and lower the main unit vertically adjusting the tape end sensor and etc. to the holes.

Note:

- Adjust the rotor of the cylinder motor and the stator of the main unit, and then lower the main unit further more till four claws catch the mechanical deck completely.
- Take care not to damage the rotor and the stator.
- When locking the claw of the front right side to the main unit, turn the REC inhibit lever so as not to damage the switch.

2. Mount the mechanical deck on the chassis in reverse order of removal.

Note:

When mounting the front panel, mount it with its door fully open.

1-5-3. Confirmation of Each Operation Mode without Cassette

1. Shut out the light to the start/end sensor.
2. Release the both sides of the lock lever and make a slot-in condition.
3. Turn the reel table manually located on the opposite side of the rotating reel table.
4. In this condition, confirmation of each operation mode can be performed.

Note:

When turning the opposite side reel table of the rotating reel table manually in playback, FF/REW mode, and sending no reel pulse, the auto eject or power off function is performed.

1-6. Main Parts Replacement

1-6-1. Top Bracket Replacement

1. Remove two securing screws (2) on the top bracket (1).
2. Remove the top bracket (1) lifting in the direction shown by the arrow.

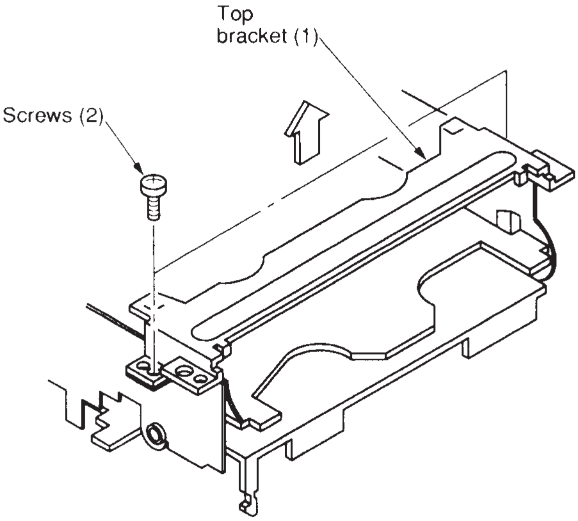

Top bracket (1)
Screws (2)

Fig. 6-1-1

3. When mounting the top bracket (1), move the tip of the grip lever (3) on the cassette holder assembly to the inclined portion of a trapezoidal cam, and then mount the top bracket (1).

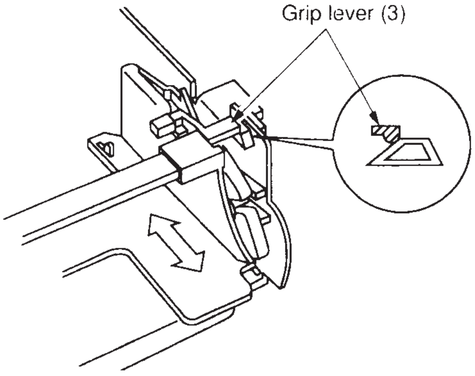

Grip lever (3)

Fig. 6-1-2

Note:

- After remounting the top bracket (1), move the cassette holder forward and backward, and then confirm the claws of the lock lever (5) catch completely the both left and right sides of the stopper section (4) at the top bracket (1).

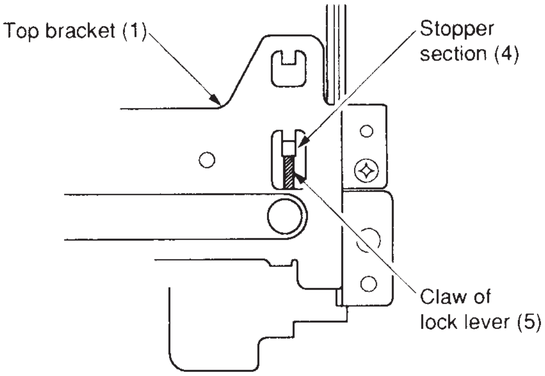

Top bracket (1)
Stopper section (4)
Claw of lock lever (5)

Fig. 6-1-3

1-6-2. Cassette Holder Assembly Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. The cassette holder assembly (1) is guided along the guide grooves (2) with both left and right bosses of the cassette holder assembly (1). So first remove each side boss (3) on both left and right sides of cassette holder assembly (1) from the guide groove (2).
3. When the cassette holder assembly (1) is set at the EJECT position, the boss is located at (a), so move the boss from (a) to (b) and remove the bosses on both left and right sides simultaneously.

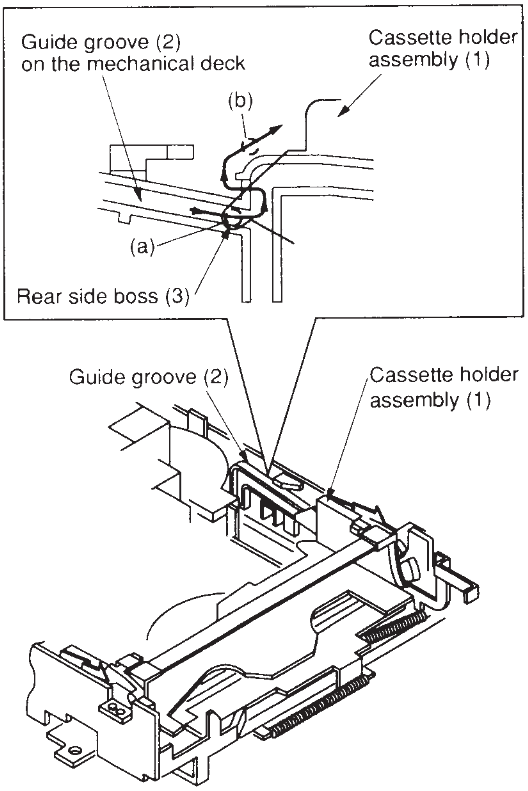

Guide groove (2) on the mechanical deck
Cassette holder assembly (1)
(b)
(a)
Rear side boss (3)
Guide groove (2)
Cassette holder assembly (1)

Fig. 6-2-1

Note:

The grip lever (4) on the cassette holder assembly (1) may catch the trapezoidal cam on the mechanical deck (2), so perform the work lifting the grip lever in the direction shown by the arrow.

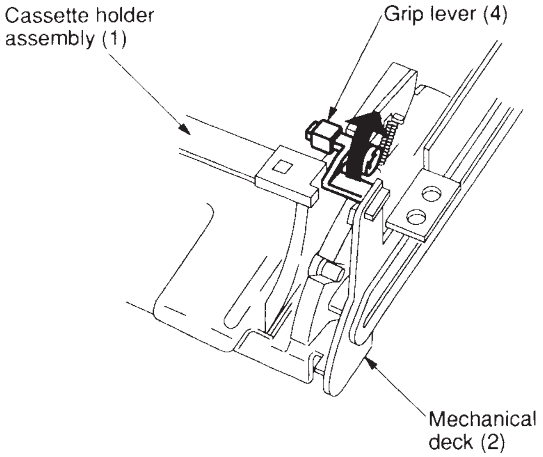

Cassette holder assembly (1)
Grip lever (4)
Mechanical deck (2)

Fig. 6-2-2

4. After removing the front side bosses (5) on both left and right sides, remove the cassette holder assembly (1) pulling to the front side.
5. When mounting the cassette holder assembly (1), insert the front side bosses (5) to the U shaped groove of the drive arm (6) and the guide groove (2) on the mechanical deck lifting the rear side of the cassette holder assembly (1).

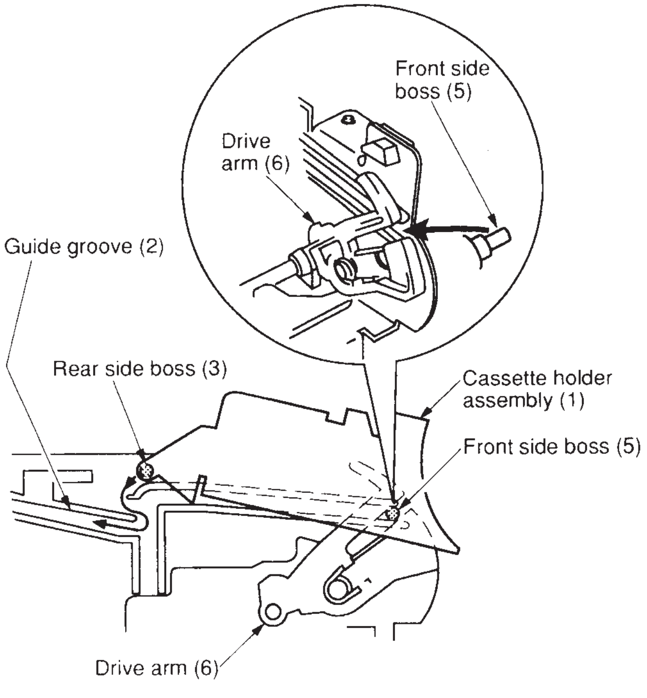

Front side boss (5)
Drive arm (6)
Guide groove (2)
Rear side boss (3)
Cassette holder assembly (1)
Front side boss (5)
Drive arm (6)

Fig. 6-2-3

6. When mounting the rear side bosses (3), perform the reverse order of removal.

1-6-3. Door Open Lever Replacement

1. Release the lock lever (2) on the cassette holder assembly (1) pressing in the direction shown by the arrow.

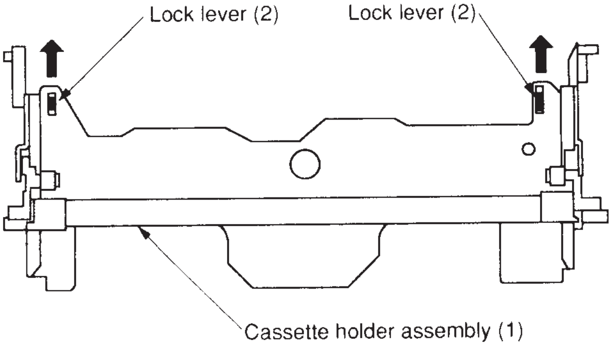

Lock lever (2)
Lock lever (2)
Cassette holder assembly (1)

Fig. 6-3-1

2. Move the cassette holder assembly (1) slightly to the rear side.
3. Remove the claws (A) and (B) on the door open lever (3) from the mechanical deck (4).
4. Match the boss on a new door open lever (3) and the hole (C) on the mechanical deck, and then insert the claws (B) first and then (A) to the mechanical deck (4).

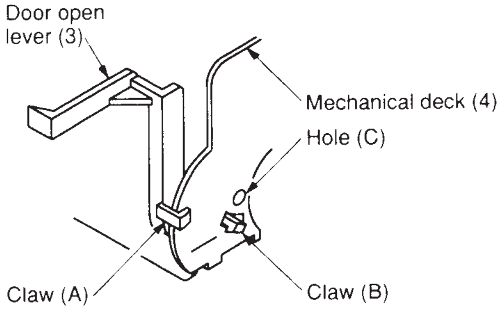

Door open lever (3)
Mechanical deck (4)
Hole (C)
Claw (A)
Claw (B)

Fig. 6-3-2

5. Remount the cassette holder assembly to the position as it was.

1-6-4. Drive Lever Gear Replacement

1. Make the cassette holder assembly to the slot-out (EJECT) position.

Note:

- In this condition, both mark holes on the F/L drive slider (1) and the mechanical deck fit with each other, also the hole of the boss on the drive lever gear (2), the center of the gear tooth and the marking line are in line.

2. Move the claw of the drive arm (3) to the direction of the arrow (A) and remove the drive lever gear (2) upward.

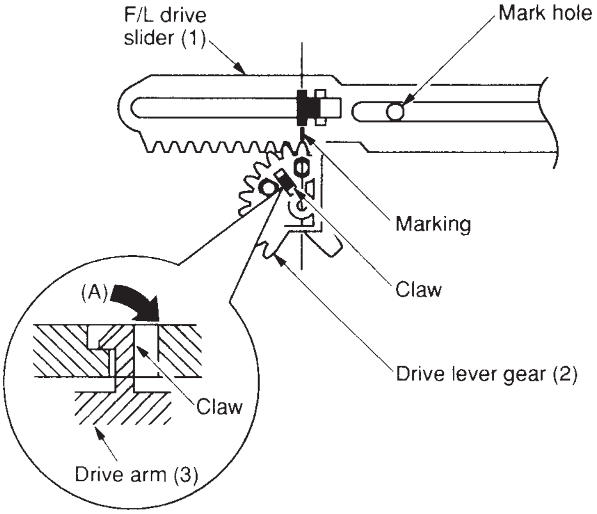

F/L drive slider (1)
Mark hole
Marking
Claw
Drive lever gear (2)
(A)
Claw
Drive arm (3)

Fig. 6-4-1

3. When remounting the drive lever gear (2), take care of the phase position (refer to the note described above.) and mount in the reverse order of removal.

1-6-5. Drive Arm Assembly Replacement

1. Remove the top bracket assembly. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the door open lever. (Refer to item "1-6-3. Door Open Lever Replacement.")
4. Remove the drive lever gear. (Refer to item "1-6-4. Drive Lever Gear Replacement".)
5. Pull the REC-inhibiting lever slightly to the front side, turn the drive arm assembly (1) to the front side and push it in the direction shown by the arrow. Remove the left side boss (2) on the drive arm assembly (1) from the cutout of the guide groove on the mechanical deck (3).
6. Remount the drive arm assembly (1) in the reverse order of removal.

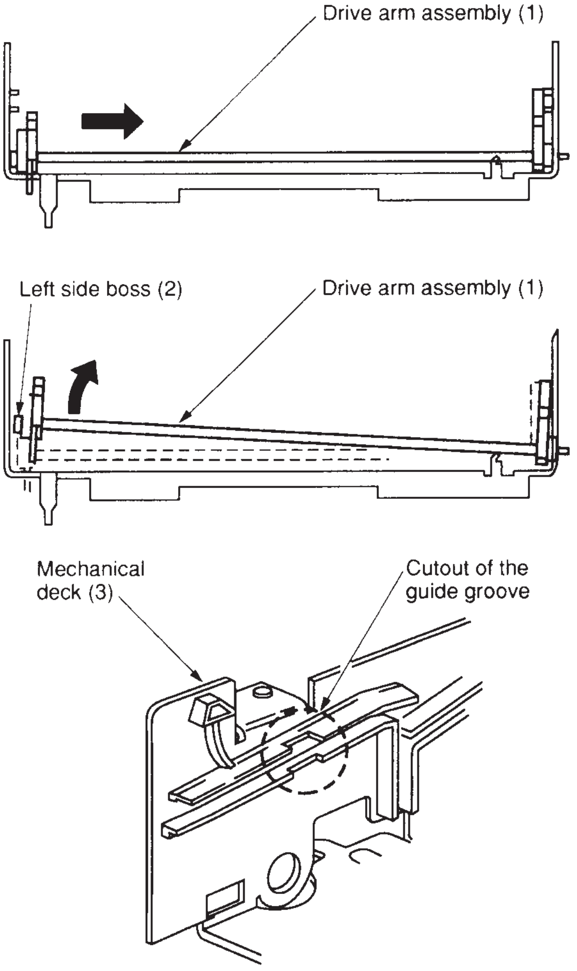

Drive arm assembly (1)
Left side boss (2)
Drive arm assembly (1)
Mechanical deck (3)
Cutout of the guide groove

Fig. 6-5-1

1-6-6. Cam Lever Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement".)
4. Remove the loading drive assembly. (Refer to item "1-6-28. Loading Drive Assembly Replacement".)
5. Remove the drive lever. (Refer to item "1-6-39. Drive Lever Replacement".)
6. Remove the pinch roller assembly. (Refer to item "1-6-20. Pinch Roller Assembly Replacement".)
7. Remove the cam gear. (Refer to item "1-6-30. Cam Gear Replacement".)
8. Move the cam lever (1) until it stops in the direction shown by the arrow (A). Pull out the cam lever (1) lifting up straightly at the position where the cam lever (1) stops.
9. Apply grease to the portions of bosses (A) to (C) on a new cam lever.

Note:

- Confirm that the boss (A) on the cam lever (1) is inserted into the hole on the F/L drive slider (2).
- After inserting the cam lever (1), confirm that the cam lever (1) moves smoothly.

10. Replace the cam lever in the reverse order of removal.

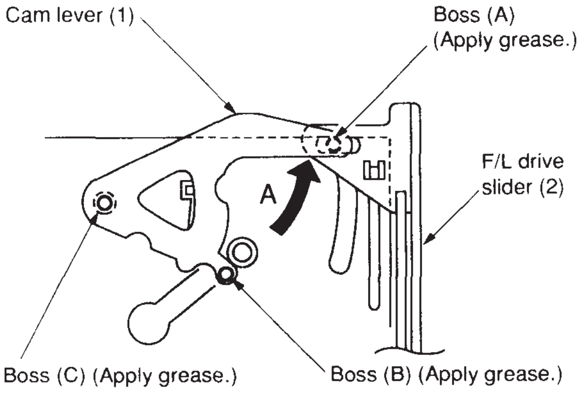


Fig. 6-6-1

1-6-7. F/L Drive Slider Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement".)
4. Remove the loading drive assembly. (Refer to item "1-6-28. Loading Drive Assembly Replacement".)
5. Remove the drive lever. (Refer to item "1-6-39. Drive Lever Replacement".)
6. Remove the pinch roller assembly. (Refer to item "1-6-20. Pinch Roller Assembly Replacement".)
7. Remove the cam gear. (Refer to item "1-6-30. Cam Gear Replacement".)
8. Remove the cam lever. (Refer to item "1-6-6. Cam Lever Replacement".)
9. Remove the drive lever gear. (Refer to item "1-6-4. Drive Lever Gear Replacement".)
10. Push the F/L drive slider (1) in the direction shown by the arrow (A) and slide it. Furthermore, pull out it to the front side lifting it in the direction shown by the arrow (B).
11. Apply grease to the shaded parts (a) to (d) on a new F/L drive slider (1).

Note:

For the phase alignment of the drive lever gear, refer to item "1-6-4. Drive Lever Gear Replacement".

12. Replace the F/L drive slider (1) in the reverse order of removal.

Note:

After completion of the replacement, confirm that the F/L drive slider (1) moves smoothly.

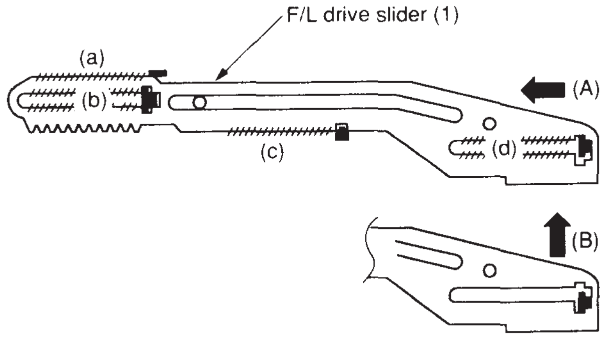


Fig. 6-7-1

1-6-8. Arm Brake Lever Assembly and Arm Brake Torsion Spring Replacement

1. Make the cassette holder assembly to the slot-out (EJECT) position.
2. Turn the arm brake lever assembly (1) in the direction shown by the arrow (A) until it stops. Pull out the arm brake lever assembly (1) to the front at the position it stops.

Note:

Take care that the arm brake torsion spring (2) is removed forcefully.

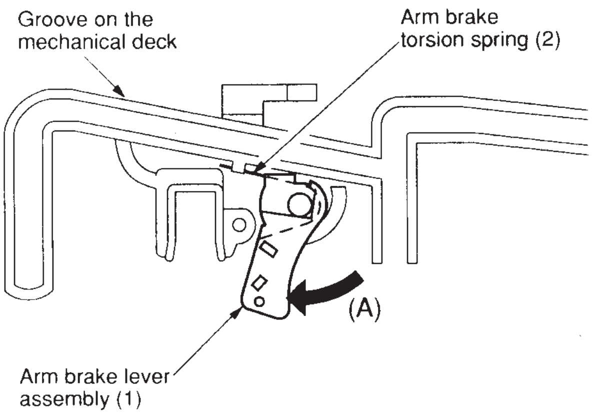

Groove on the mechanical deck
Arm brake torsion spring (2)
(A)
Arm brake lever assembly (1)

Fig. 6-8-1

3. Hook the arm brake torsion spring (2) temporarily to a new arm brake lever assembly (1).

Note:

Take care of the direction of the arm brake torsion spring (2) so that the longer end of the arm brake torsion spring (2) is hooked on the temporary hook.

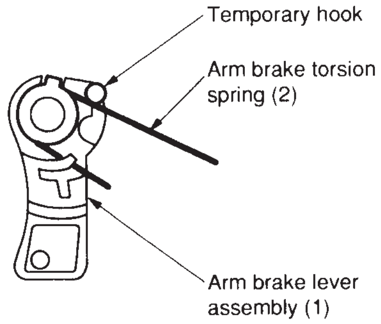

Temporary hook
Arm brake torsion spring (2)
Arm brake lever assembly (1)

Fig. 6-8-2

4. Insert the hook portion on the arm brake lever assembly (1) to the cutout on the mechanical deck.
5. Turn the arm brake lever assembly (1) counterclockwise and fix it at the position which the arm brake lever assembly (1) faces to the straight below.
6. When pushing the tip of the arm brake torsion spring (2) located at (B) position, the tip is removed from the temporary hook and moves to the hook on the mechanical deck.
7. The arm brake lever assembly turns to the specified position by force of the arm brake torsion spring.

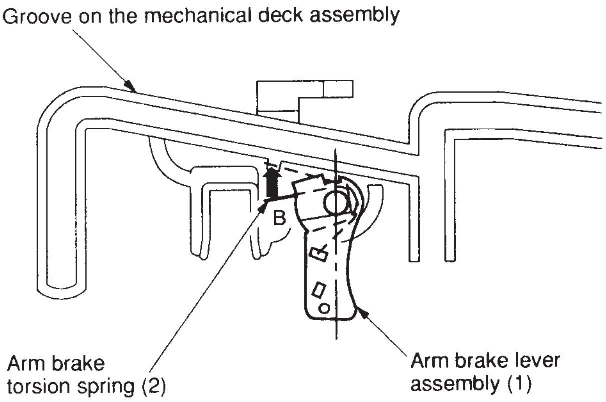

Groove on the mechanical deck assembly
B
Arm brake torsion spring (2)
Arm brake lever assembly (1)

Fig. 6-8-3

1-6-9. Cylinder Assembly Inspection and Replacement

<Inspection>

1. Check if the tape transport surface on the lower cylinder assembly are not damaged.
2. Check if the rotation of the upper cylinder assembly is not abnormal.

When any abnormality is found according to the inspection procedures described above 1 and 2, replace the cylinder assembly.

<Replacement>

1. Remove the ground brush assembly.
2. Remove the head cleaner. (Refer to item "1-6-13. Head Cleaner Replacement.")
3. Remove the FFC (1) on the pre amplifier.
4. Remove three screws (2) and the cylinder holding plate (3) and (4). (Refer to item "1-6-12. Cylinder Holding Plate Replacement".)
5. Remove the cylinder assembly (5).
6. Remount the cylinder assembly (5) in the reverse order of removal. Fix the cylinder pressing slightly in the direction shown by the arrow A and the cylinder holding plate (3) pressing slightly in the direction shown by the arrow (B). (Tightening torque: 294 – 392 mN•m (3 – 4 kg•cm))

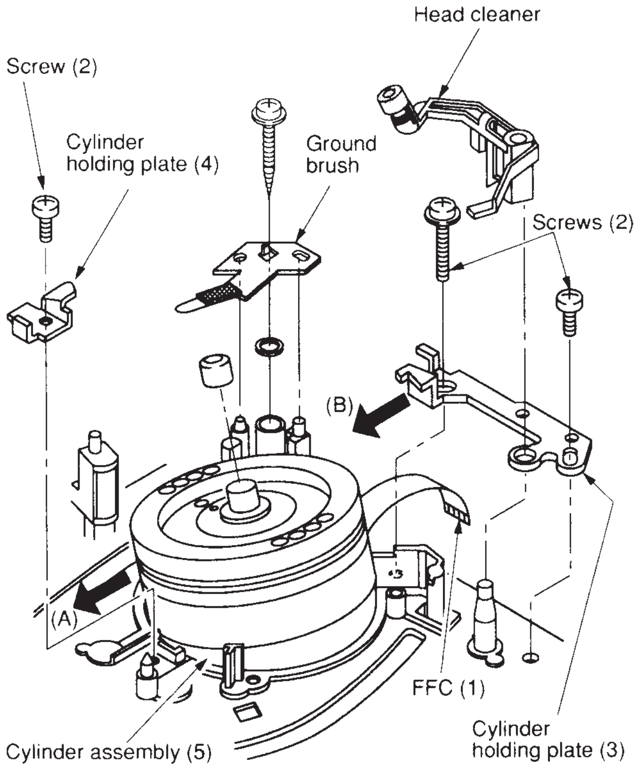

Head cleaner
Screw (2)
Cylinder holding plate (4)
Ground brush
Screws (2)
(B)
(A)
FFC (1)
Cylinder assembly (5)
Cylinder holding plate (3)

Fig. 6-9-1

Note:

- When remounting the cylinder holding plate (3), insert the FFC under the tip of the cylinder holding plate (3).
- When replacing, take much care not to touch the video head directly and damage the cylinder.

7. Perform the tape transport adjustment.

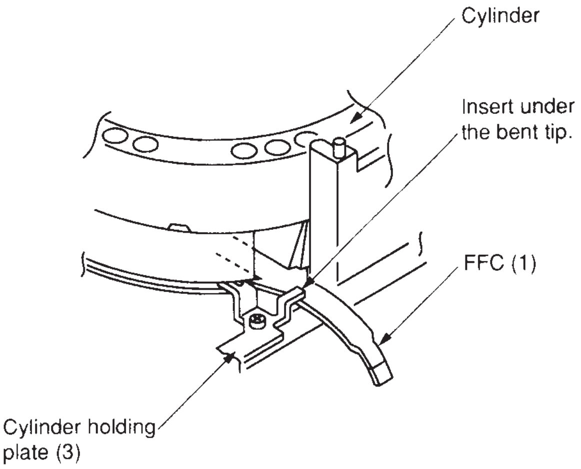

Cylinder
Insert under the bent tip.
FFC (1)
Cylinder holding plate (3)

Fig. 6-9-2

1-6-10. Upper and Lower Cylinder Assembly Replacement (Rotor Assembly Replacement)

Note:

- When handling a cylinder, always put on gloves, etc. Do not touch the cylinder directly with your naked hand.
- Do not touch video heads (1) with your hand. If touched they may be easily damaged.
- Do not apply excessive force to the rotor assembly light FG section (2).

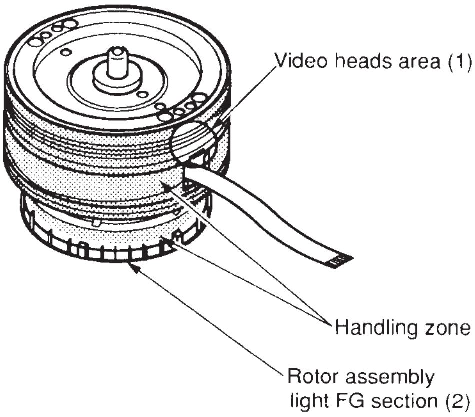

Video heads area (1)
Handling zone
Rotor assembly
light FG section (2)

Fig. 6-10-1

<Disassembling>

1. Remove the cylinder assembly from the mechanical deck.
2. Place the cylinder upside down, and remove the rotor assembly (1) from the cylinder assembly.

Note:

The cylinder has two types of rotor assembly, and removal methods for each is different as stated below.

1) **Screw securing type (Fig. 6-10-2)**
   - Remove two securing screws (2) and remove the rotor assembly (1).

Note:

Take care not to lose rubber dampers attached to securing screws (2).

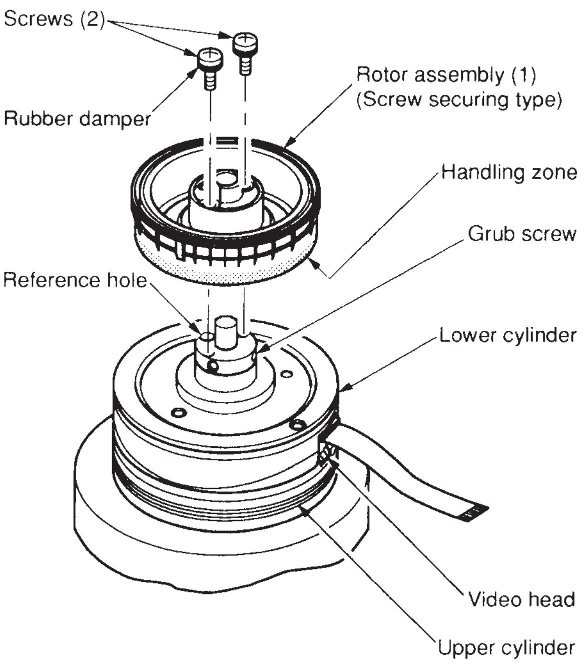

Screws (2)
Rubber damper
Rotor assembly (1)
(Screw securing type)
Handling zone
Grub screw
Reference hole
Lower cylinder
Video head
Upper cylinder

Fig. 6-10-2

2) **Press-fit securing type (Fig. 6-10-3)**
   - Hold outer side of upper cylinder (3) and slowly pull out the rotor while rotating the rotor slowly.

Note:

Do not apply an excessive force to the rotor assembly light FG section.

(When replacing the rotor assembly (1), refer to step 3 of item "<Assembling>".)

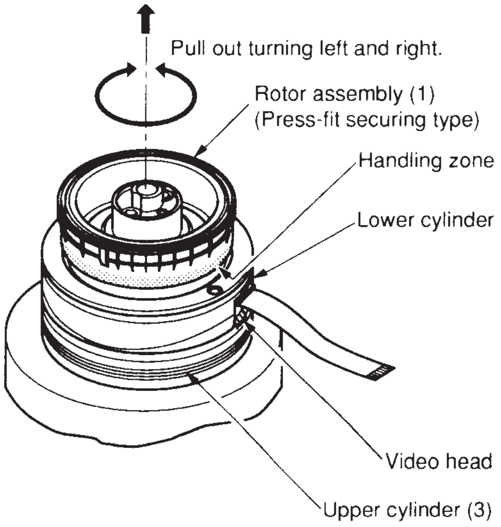

Pull out turning left and right.
Rotor assembly (1)
(Press-fit securing type)
Handling zone
Lower cylinder
Video head
Upper cylinder (3)

Fig. 6-10-3

3. Loosen set screw (4) at side of pre-load boss (3), using a hex wrench and remove the pre-load boss (3) and pre-load spring (5).

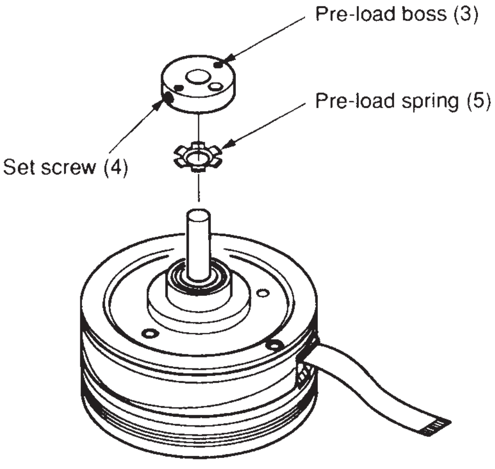

Pre-load boss (3)
Pre-load spring (5)
Set screw (4)

Fig. 6-10-4

4. Slowly pull out the upper cylinder assembly (6) from the lower cylinder assembly (7). In this case, remove R. T gap washers (8) inserted onto the shaft. Also, remove ground cap (9) put on the shaft of upper cylinder assembly (6). The R. T gap washers (8), and ground cap (9) are used again in assembling, so, keep them securely.

5. If tip (carbon contact) of ground cap (9) is excessively worn out, replace the ground cap (9).

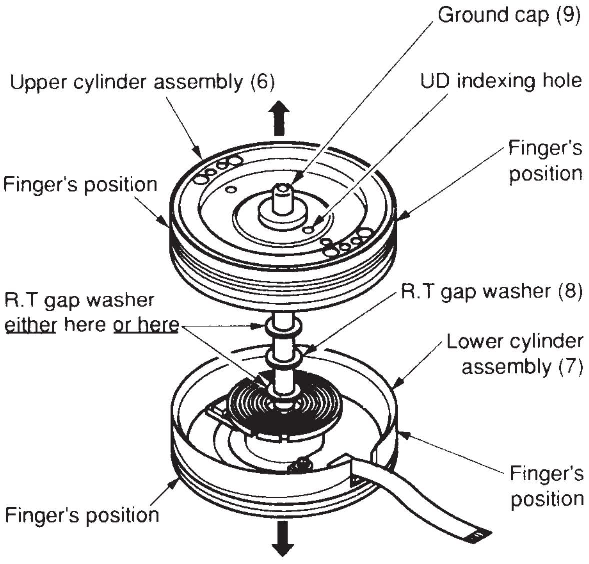

Ground cap (9)
Upper cylinder assembly (6)
UD indexing hole
Finger's position
Finger's position
R.T gap washer either here or here
R.T gap washer (8)
Lower cylinder assembly (7)
Finger's position
Finger's position

Fig. 6-10-5

<Assembling>

1. Insert R. T gap washers into a new upper cylinder shaft, and install the upper cylinder to the lower cylinder assembly.

Note:

- Since the shaft and bearing (1) are machined with high accuracy, insert the shaft just vertically into the bearing (1) so that unreasonable force is not applied.
- Take care the shaft and inside cylinder are free from any foreign matters such as dusts, etc.

2. Apply pre-load spring (2) to the bearing (1).
   1) Place the cylinder upside down, insert the pre-load spring (2) and pre-load boss (3) into the shaft, and align phase of the reference video head and the pre-load boss reference hole.

Note:

Do not confuse outside and inside of the pre-load spring (2).

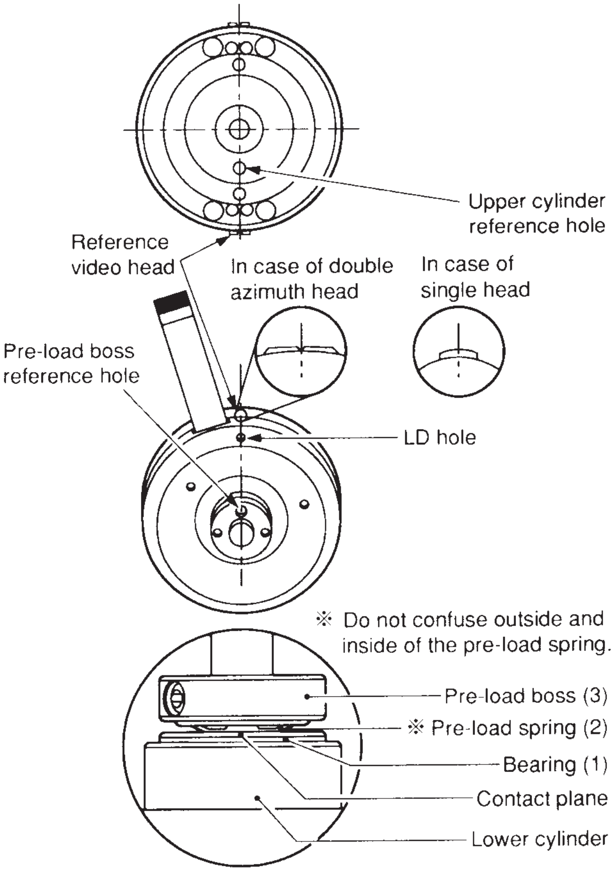

Upper cylinder reference hole
Reference video head
In case of double azimuth head
In case of single head
Pre-load boss reference hole
LD hole
※ Do not confuse outside and inside of the pre-load spring.
Pre-load boss (3)
※ Pre-load spring (2)
Bearing (1)
Contact plane
Lower cylinder

Fig. 6-10-6

2) Place the PRE-LOAD TOOL 1.8 (4) (Part No.: 70909416) on the pre-load boss (3) and press it with a finger until it touches end of the shaft.

3) Under condition of 2-2) above, tighten the set screw at the pre-load boss side with a hex wrench.

4) Confirm deviation of the phase. If deviated, loosen the set screw and repeat steps 2-1) through 3).

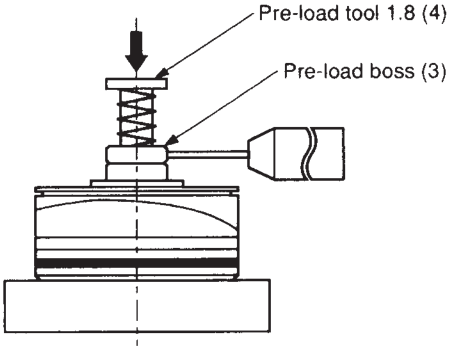

Pre-load tool 1.8 (4)
Pre-load boss (3)

Fig. 6-10-7

3. Mount the rotor assembly (5).

1) Screw securing type (Fig. 6-10-8)

- Align the pre-load boss reference hole (6) and the rotor assembly reference hole (7), and fix the rotor assembly (5) with two screws (8). (Tightening torque: 200 – 300mN•m)

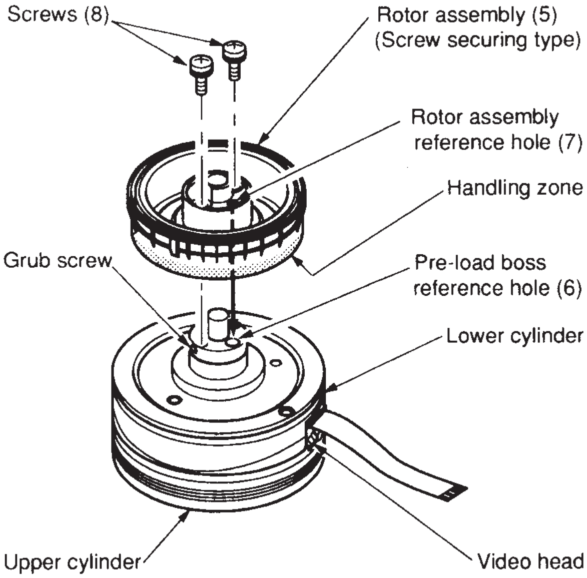

Screws (8)
Rotor assembly (5)
(Screw securing type)
Rotor assembly reference hole (7)
Handling zone
Grub screw
Pre-load boss reference hole (6)
Lower cylinder
Upper cylinder
Video head

Fig. 6-10-8

2) Press-fit securing type (Fig. 6-10-9)

- Align the pre-load boss reference hole (6) and the rotor assembly reference hole (7), and then press the rotor assembly (5) with a finger until it touches the pre-load boss. In this case, the press-fitting can be easily made by putting a coin between the rotor assembly (5) and the finger.

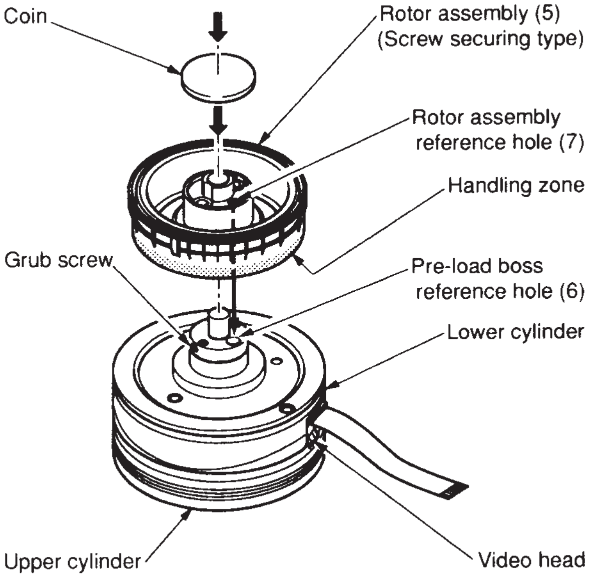

Coin
Rotor assembly (5)
(Screw securing type)
Rotor assembly reference hole (7)
Handling zone
Grub screw
Pre-load boss reference hole (6)
Lower cylinder
Upper cylinder
Video head

Fig. 6-10-9

- Confirm deviation of phase after the mounting. If deviated, correct the phase by rotating the rotor assembly (5).

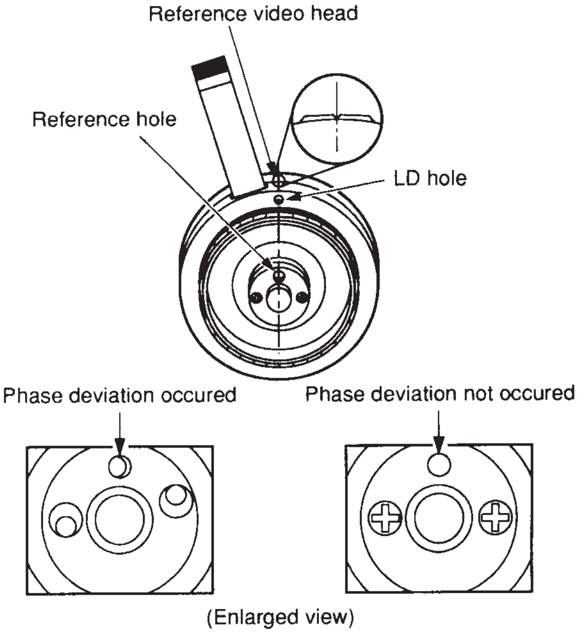

Reference video head
Reference hole
LD hole
Phase deviation occured
Phase deviation not occured
(Enlarged view)

Fig. 6-10-10

4. Confirm outside of the cylinder is free from scratches, dirt, and the cylinder rotates correctly without any abnormality.
5. Mount the cylinder assembly on the mechanical deck.
6. Perform the tape transport adjustment.

1-6-12. Cylinder Holding Plate Replacement

1. Remove screws (1) and (2) securing the cylinder holding plate (3) and a screw (5) securing the cylinder holding plate (4).
2. Remove the cylinder holding plate (3) and (4) sliding in the direction shown by the arrow (B) and (A).
3. Eliminate the cylinder lock key (wedge shaped parts).
4. After replacing the cylinder holding plates (3) and (4), mount new parts in the reverse order of removal.

Note:

- When remounting, fix the cylinder while pushing in the direction shown by the arrow (A) and the cylinder holding plate (3) in the direction shown by the arrow (B). Then tighten three screws while pushing the cylinder holding plate (4) toward the stopper on the outsert of the mechanical deck.
- Take care of the position inserting the FFC. (Refer to item "1-6-9. Cylinder Assembly Inspection and Replacement".)
- Tightening order of the screws is (1) → (2) → (5).
- Tightening torque of the screws (1), (2), (5) is 294 – 392 mN•m (3 – 4 kg•cm).
- Take care of the position inserting the FFC when mounting the cylinder holding plate (3). (Refer to item "1-6-9. Cylinder Assembly Inspection and Replacement".)

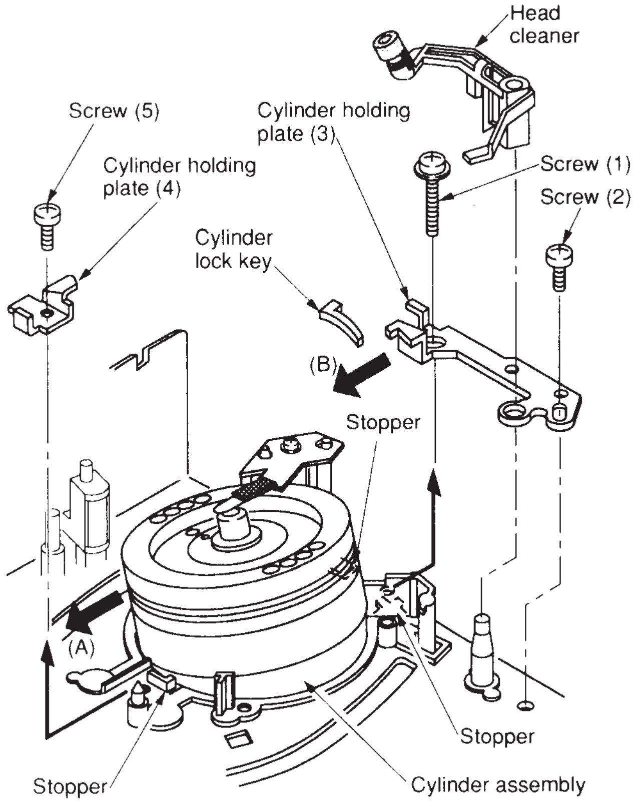

Head cleaner
Screw (5)
Cylinder holding plate (3)
Cylinder holding plate (4)
Screw (1)
Screw (2)
Cylinder lock key
(B)
Stopper
(A)
Stopper
Stopper
Cylinder assembly

Fig. 6-12-1

1-6-13. Head Cleaner Replacement

<Roller sub assembly replacement>

1. Remove the roller sub assembly (2) pulling upward from the hook (A) on the cleaner lever (1).
2. After replacing the roller sub assembly, mount in the reverse order of removal.

<Cleaner lever replacement>

1. Undo the hook (B) of the cleaner lever (1) from the mechanical deck, and pull out the cleaner lever (1) upward.
2. Replace the cleaner lever (1) on the roller sub assembly (2), and mount the cleaner lever (1) in the reverse order of removal.

Note:

- Take care the roller sub assembly (2) is not stained with grease or oil.

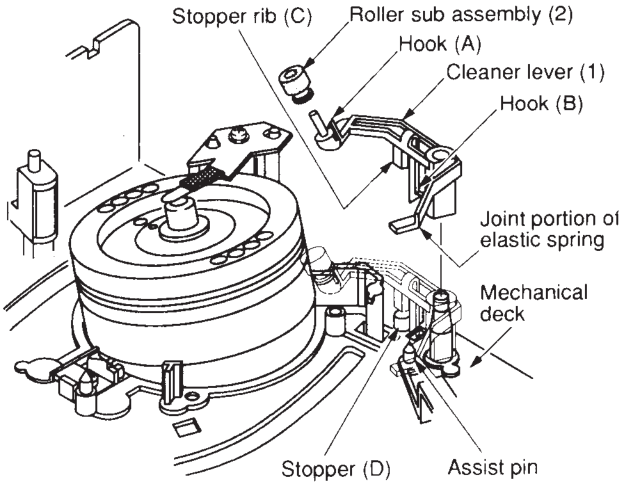

Stopper rib (C)
Roller sub assembly (2)
Hook (A)
Cleaner lever (1)
Hook (B)
Joint portion of elastic spring
Mechanical deck
Stopper (D)
Assist pin

Fig. 6-13-1

Note:

- When remounting the head cleaner, position the stopper rib (C) in front of the stopper (D).

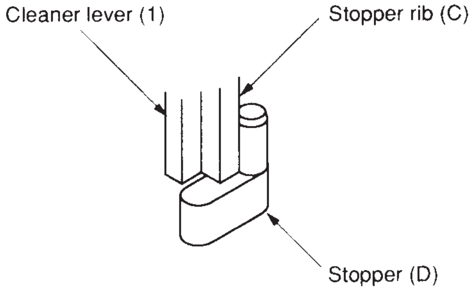

Cleaner lever (1)
Stopper rib (C)
Stopper (D)

Fig. 6-13-2

Note:

- Confirm that the joint portion (E) of the elastic spring positions in front of the assist pin (F) on the cleaner assist lever (4).

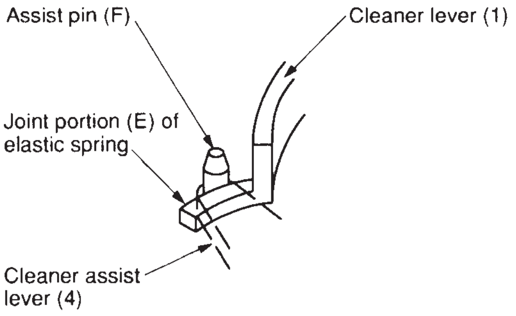

Assist pin (F)
Cleaner lever (1)
Joint portion (E) of elastic spring
Cleaner assist lever (4)

Fig. 6-13-3

1-6-14. No. 8, No. 3 Guide Sleeves Replacement

1. When replacing the No. 8 guide sleeve (1), first remove the guide cap (2) on the loading bracket assembly.
2. Pull out the guide sleeve (1) from the guide post (3).

Note:

- Take care not to break the No. 8, No. 3 guide posts on the mechanical deck if twisting the guide sleeve forcefully.

3. Insert a new guide sleeve (1) to the guide post.

Note:

- When inserting the guide sleeve (1), take care so that its hole faces the opposite side to the tape transport surface.

4. For No. 8 guide sleeve, insert the No. 8 guide cap (2) onto it.

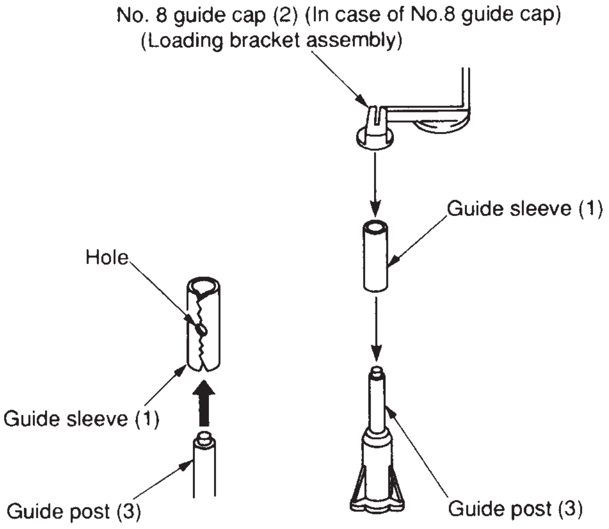

No. 8 guide cap (2) (In case of No.8 guide cap)
(Loading bracket assembly)
Guide sleeve (1)
Hole
Guide sleeve (1)
Guide post (3)
Guide post (3)

Fig. 6-14-1

1-6-15. ACE Head Assembly Replacement

1. Remove the FFC (1) from the connector.
2. Remove two screws (2) and remove the ACE main base (3) and ACE head assembly (4).
3. Remove three adjusting screws (5), (6), and (7) and then remove the ACE head assembly (4).

Note:

- When replacing ACE head (9) only without replacing its PC board, unsolder the ACE head (9) on the ACE head PC board (8) and then remove the ACE head (9) and the ACE head PC board (8).

4. Mount the ACE head assembly (4) in the reverse order of removal.

Note:

- When reassembling the ACE head assembly (4), First set the ACE springs (10) between the ACE head assembly (4) and the ACE main base (3), and secure the adjusting screws (5), (6), and (7).

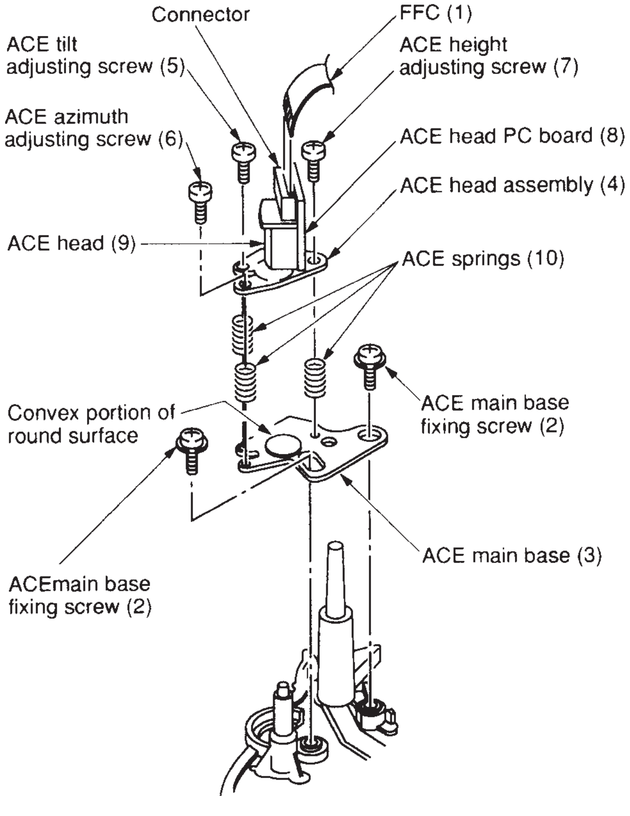

Connector
FFC (1)
ACE tilt adjusting screw (5)
ACE height adjusting screw (7)
ACE azimuth adjusting screw (6)
ACE head PC board (8)
ACE head assembly (4)
ACE head (9)
ACE springs (10)
ACE main base fixing screw (2)
Convex portion of round surface
ACE main base (3)
ACEmain base fixing screw (2)

Fig. 6-15-1

- When securing three adjusting screws, mount the ACE main base (3) and ACE head assembly (4) so that the clearance between them becomes parallel with the specified preset value (4.3 ± 0.1 mm).

5. After replacing, perform the tape transport adjustment.

Note:

- When replacing the ACE head assembly (4), always use an ACE head (9) having the same part number. Do not use any other ACE head assembly.

1-6-16. FE Head Replacement

1. Open the FE head holding hook (1) on the mechanical deck slightly in both left and right directions and remove the FE head (2) by moving in the direction shown by the arrows.
2. Replace the FE head (2) and mount the parts in the reverse order of removal.
3. Perform adjustment from the linearity adjustment item in the tape transport system adjustment.

Note:

- When mounting the FE head, Push the head backward completely.
- Though FE head (2) can be removed upward by opening the FE head holding hook (1) to both left and right directions, perform the standard replacement procedure described above since this may cause deformation of the hook.

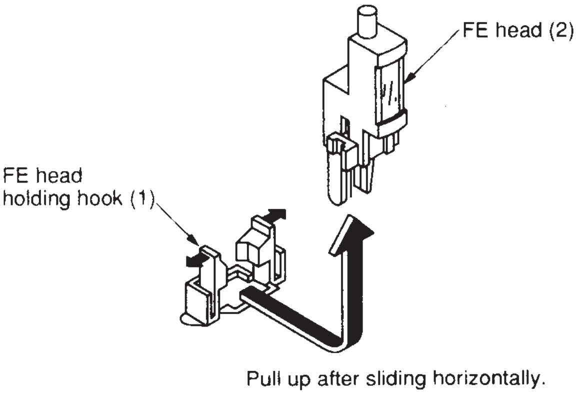

FE head (2)
FE head holding hook (1)
Pull up after sliding horizontally.

Fig. 6-16-1

1-6-17. S, T Slider Replacement

1. Remove the tension lever assembly. (Refer to item "1-6-22. Tension Lever Assembly Replacement".)
2. Remove the loading slider. (Refer to item "1-6-24. Loading Slider Replacement".)
3. Remove the S loading assembly. (Refer to item "1-6-23. S Loading Assembly Replacement".)
4. Remove the T loading assembly. (Refer to item "1-6-23. T Loading Assembly Replacement".)
5. Remove the S slider (1) and T slider (2) lifting up to the cutout of the groove on the mechanical deck (3).
6. Remove the S and T guide rollers and mount a new slider.
7. Mount the parts in the reverse order of removal.

Note:

Perform the phase alignment between the loading slider (4) and S, T loading assemblies (5), (6) referring each replacement procedure.

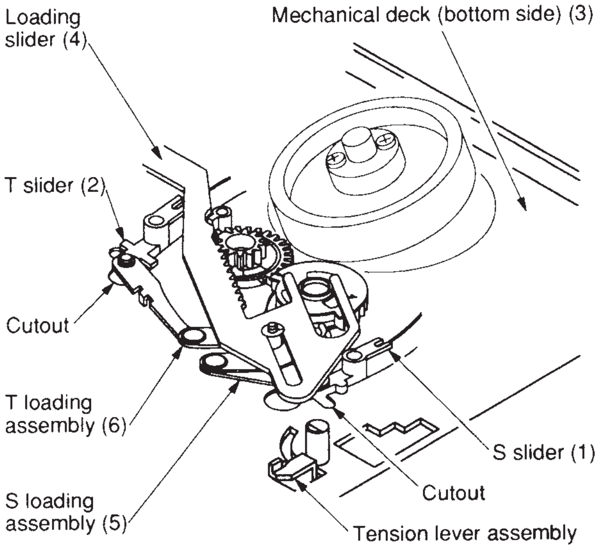

Loading slider (4)
Mechanical deck (bottom side) (3)
T slider (2)
Cutout
T loading assembly (6)
S slider (1)
Cutout
S loading assembly (5)
Tension lever assembly

Fig. 6-17-1

8. After completion of the replacement, perform the adjustment from item 1 in the tape transport system adjustment.

1-6-18. S, T Guide Rollers Replacement

The same replacement procedures will be applied for the S, T guide rollers.

1. Turn the guide roller (1) counterclockwise and remove the guide roller (1) from the slider assembly (2).
2. Mount a new guide roller on the slider assembly (2) turning clockwise.
3. After completion of the replacement, perform the adjustment from the linearity adjustment in the tape transport system adjustment.

Note:

- O ring is not applied to the T guide roller.
- For the T guide roller, marking is located on the upper flange. So take care not to mis-mount with the S guide roller.

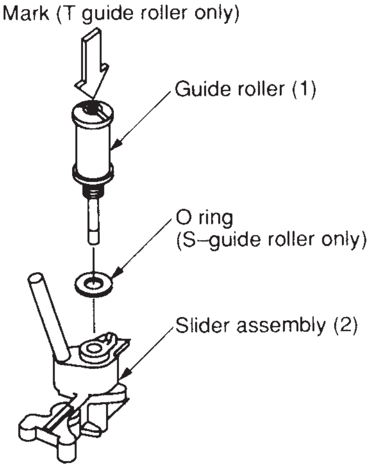


Fig. 6-18-1

1-6-19. S, T Impedance Roller Replacement

1. Remove two screws (1) and (2), and then remove two brackets (3), (4).
2. Replace two impedance rollers (5), (6).
3. Mount the parts in the reverse order of removal.
4. After completion of the replacement, perform the adjustment from the linearity adjustment in the tape transport system adjustment.

Note:

- S, T impedance rollers (5), (6) is not always applied to all models.

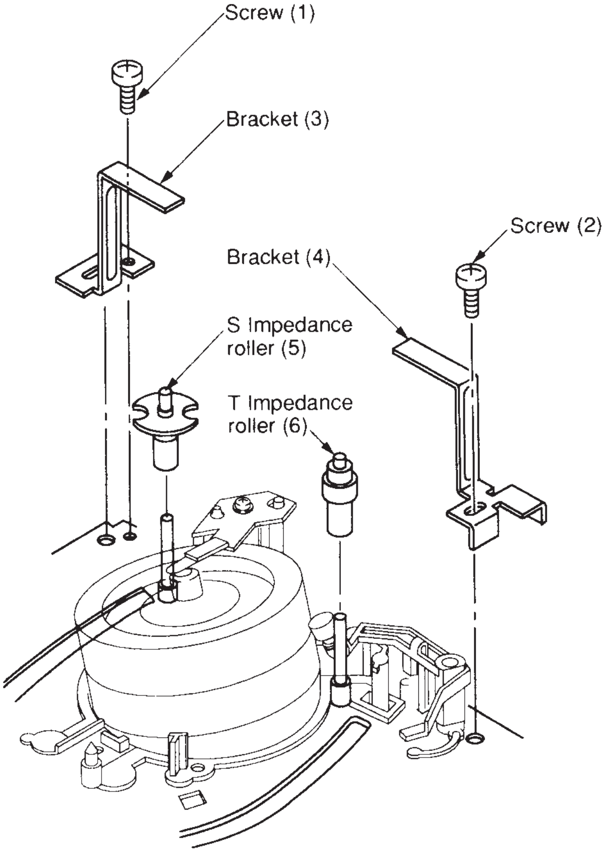
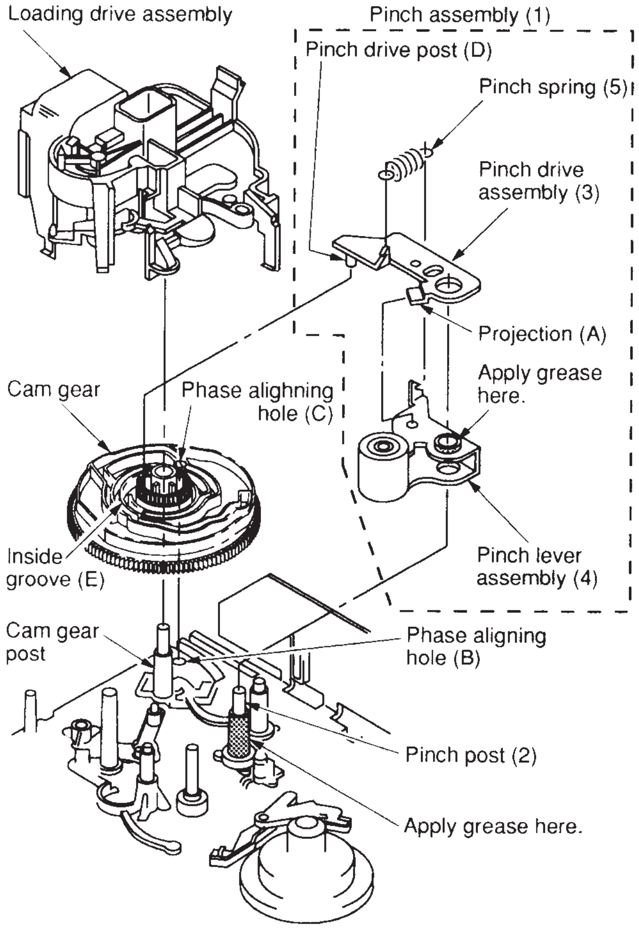


Fig. 6-19-1

1-6-20. Pinch Roller Assembly Replacement

1. Remove the loading drive assembly (Refer to item "1-6-28. Loading Drive Assembly Replacement".)
2. Remove the pinch assembly (1) lifting vertically from the pinch post (2).
3. Remove the pinch spring (5) from the hooks on the pinch drive assembly (3) and the pinch lever assembly (4).
4. Turn the projection (A) on the pinch drive assembly (3) counterclockwise till it goes to the cutout on the pinch lever assembly (4).
5. After replacing, mount the parts in the reverse order of removal.
6. After completion of the replacement, perform the tape transport adjustment.



Loading drive assembly
Pinch assembly (1)
Pinch drive post (D)
Pinch spring (5)
Pinch drive assembly (3)
Projection (A)
Apply grease here.
Cam gear
Phase alighning hole (C)
Inside groove (E)
Pinch lever assembly (4)
Cam gear post
Phase aligning hole (B)
Pinch post (2)
Apply grease here.

Fig. 6-20-1

Note:

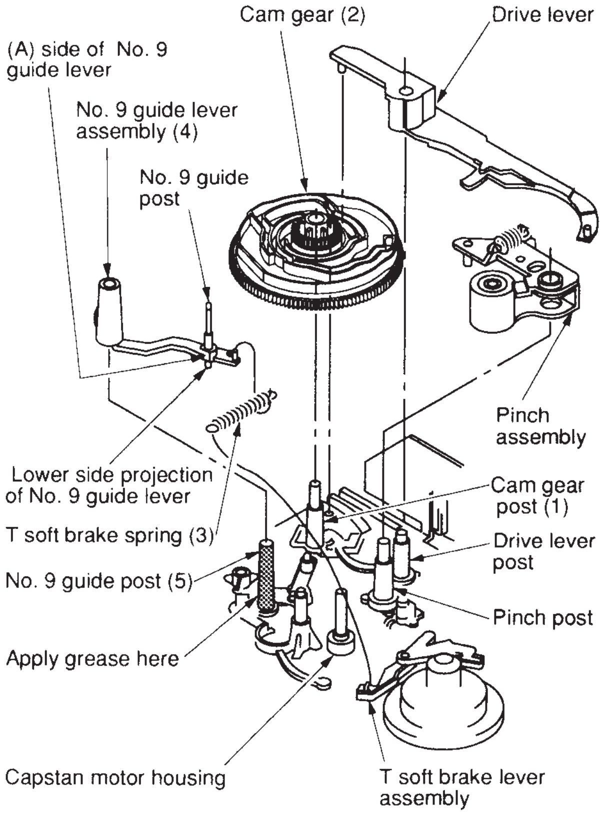
- For the removal and assembling of the loading drive assembly, refer to item 1-6-28.
- When inserting the pinch assembly (1) into the pinch post (2), insert it so that the pinch drive post (D) enters the groove (E) inside the cam gear.
- Take care not to touch the surface of the pinch roller and the grease is not stained on it.
- Be sure to apply grease to the surface of the bar-ring on the pinch lever assembly (4) and the pinch post (2) on the mechanical deck.

1-6-21. No. 9 Guide Lever Assembly Replacement

1. Remove the loading drive assembly. (Refer to item "1-6-28. Loading Drive Assembly Replacement".)
2. Remove the drive lever. (Refer to item "1-6-39. Drive Lever Replacement".)
3. Remove the pinch assembly. (Refer to item "1-6-20. Pinch Roller Assembly Replacement".)
4. Remove the ACE head assembly. (Refer to item "1-6-15. ACE Head Assembly Replacement".)
5. Remove the cam gear (2) from the cam gear post (1).
6. Remove the T soft brake spring (3).
7. Remove the No. 9 guide lever assembly (4) lifting the No. 9 guide lever assembly upward from the No. 9 guide post (5).
8. After replacing, mount the parts in the reverse order of removal.
9. After completion of the replacement, perform the tape transport adjustment.

Note:

- When mounting the No. 9 guide lever assembly (4), confirm that (A) side of the No. 9 guide lever assembly (4) touches the capstan motor housing portion.
- After inserting the No. 9 guide lever assembly (4) into the No. 9 guide post (5), confirm that the lower projection of the No. 9 guide lever assembly (4) touches to the upper surface of the mechanical deck.
- Take care that the grease is not stained on the No. 9 guide post of the No. 9 guide lever assembly (4).
- Be sure to apply grease to the No. 9 guide post (5).



Cam gear (2)
Drive lever
(A) side of No. 9 guide lever
No. 9 guide lever assembly (4)
No. 9 guide post
Pinch assembly
Lower side projection of No. 9 guide lever
Cam gear post (1)
T soft brake spring (3)
Drive lever post
No. 9 guide post (5)
Pinch post
Apply grease here
Capstan motor housing
T soft brake lever assembly

Fig. 6-21-1

1-6-22. Tension Lever Assembly, Band Holder and Band Brake Replacement

1. Remove the tension spring (1).

Note:

- Take care not to extend or deform the tension spring.

2. After setting the band brake adjuster to the band holder assembling position, undo the claw of the snap-fit type and remove the band holder from the band brake adjuster by lifting it upward.

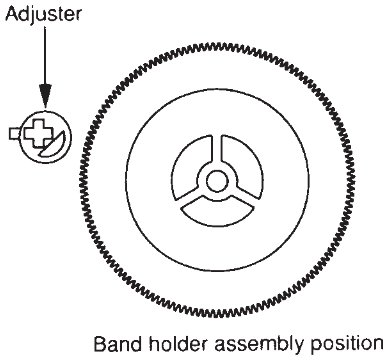

Adjuster
Band holder assembly position

Fig. 6-22-1 Detail of band holder assembling

3. Undo the claw of the outsert on the mechanical deck catching the shaft of the tension lever assembly (3) and remove the tension lever assembly lifting it upward.
4. Remove the band brake (5) from the reel table while pulling the S soft brake lever (4) in the direction shown by the arrow.
5. Remove the band brake (5) from the hook on the tension lever assembly (3).

Note:

- Take care not to contaminate, bend or damage the felt surface on the band brake (5).

6. After replacing the tension lever assembly (3), clean the shaft on the tension lever and apply a few amount of oil.
7. Mount the parts in the reverse order of the removal.
8. After mounting, check the tension post position and perform the adjustment and back tension check.
9. After completion of the replacement, perform the adjustment from the linearity adjustment in the tape transport system adjustment.

Note:

- The band holder (2) can be replaced in the procedures described above steps 1 to 3.
- The band brake (5) can be replaced in the procedures described above steps 1 to 5.
- When replacing the band holder (2) and band brake (5), the linearity adjustment is not necessary.

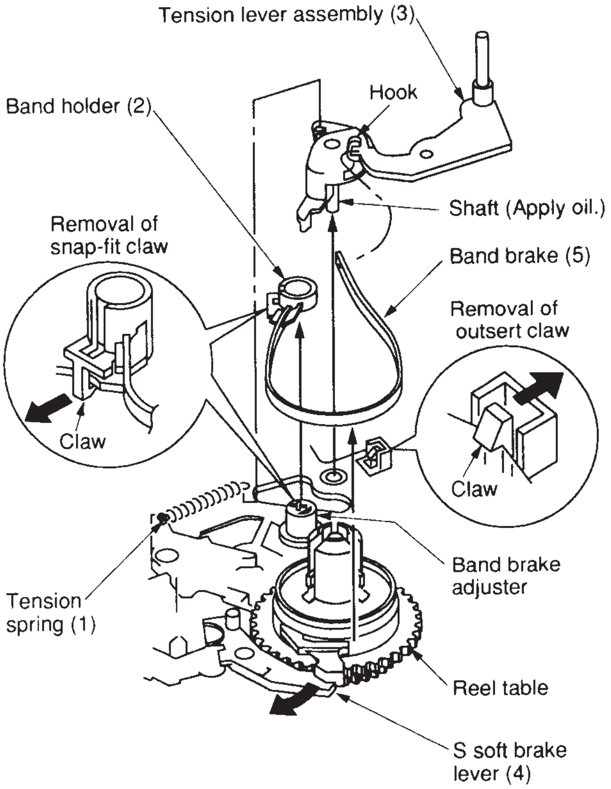

Tension lever assembly (3)
Band holder (2)
Hook
Shaft (Apply oil.)
Removal of snap-fit claw
Band brake (5)
Removal of outsert claw
Claw
Claw
Band brake adjuster
Tension spring (1)
Reel table
S soft brake lever (4)

Fig. 6-22-2

1-6-23. S,T Loading Assembly Replacement

1. Remove the mechanical deck assembly from the main PC board.
2. Set the mechanical position to the F/L out position (front side). Turn over the mechanical deck.
3. Remove the loading slider assembly. (Refer to item "1-6-24. Loading Slider Assembly Replacement".)

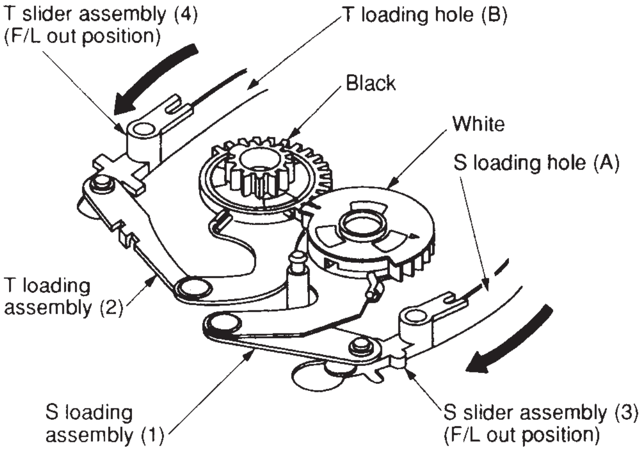

T slider assembly (4)
(F/L out position)
T loading hole (B)
Black
White
S loading hole (A)
T loading assembly (2)
S loading assembly (1)
S slider assembly (3)
(F/L out position)

Fig. 6-23-1

4. Remove the S, T loading assemblies (1), (2).
5. Insert the S, T slider assemblies (3), (4) along the cutout of the S, T loading holes (A) and (B) on the mechanical deck and set the S, T slider assemblies (3), (4) to the loading position (rear side).
6. Insert the T loading assembly (2) to the post (C) on the T slider assembly (4) and the post (D) on the mechanical deck. And insert the S loading assembly (1) to the post (E) on the S slider assembly (3) and the post (F) on the mechanical deck.

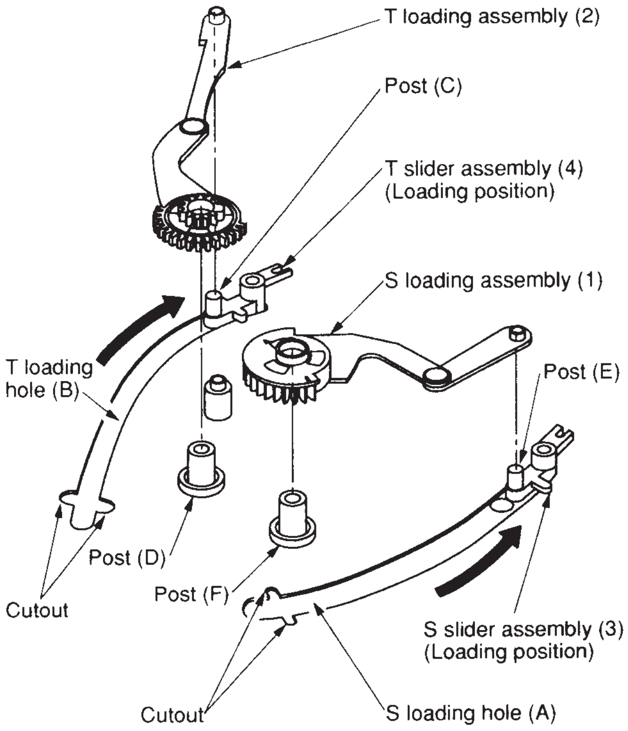

T loading assembly (2)
Post (C)
T slider assembly (4)
(Loading position)
S loading assembly (1)
T loading hole (B)
Post (E)
Post (D)
Post (F)
Cutout
S slider assembly (3)
(Loading position)
Cutout
S loading hole (A)

Fig. 6-23-2

Note:

- Align the phases of the ▲ marks on the S, T loading gear (1), (2).

7. Set the S, T slider assemblies (3), (4) to the F/L out position.

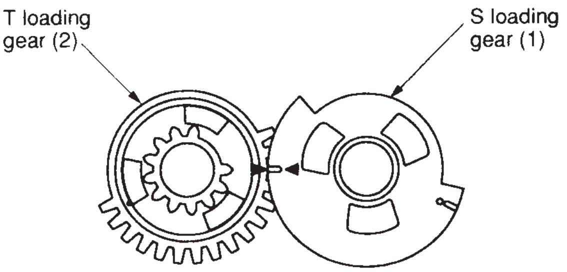

T loading gear (2)
S loading gear (1)

Fig. 6-23-3

1-6-24. Loading Slider Assembly Replacement

1. Remove the mechanical deck from the main PC board.
2. Set the mechanical position to the F/L out position.
3. Turn over the mechanical deck.
4. Remove the stop ring (1).
5. Remove the loading slider assembly (2) while lifting its tip upward using the mold portion on the loading slider assembly (2) as a fulcrum.
6. Mount the parts in the reverse order of removal.

Note:

- When mounting the loading slider assembly (2), insert the tip of the loading slider assembly (2) slightly to the mold portion, then mount it so that the claw on the outsert is in the position of the cutout portion of the loading slider assembly.
- Confirm that the position mark on the loading slider assembly (2) and the mark on the T loading gear match each other in position.

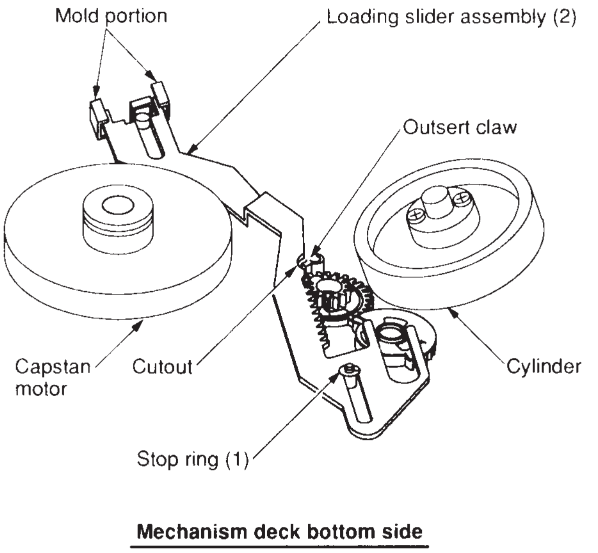

Mold portion
Loading slider assembly (2)
Outsert claw
Capstan motor
Cutout
Cylinder
Stop ring (1)
Mechanism deck bottom side

Fig. 6-24-1 View from Mechanical deck bottom side

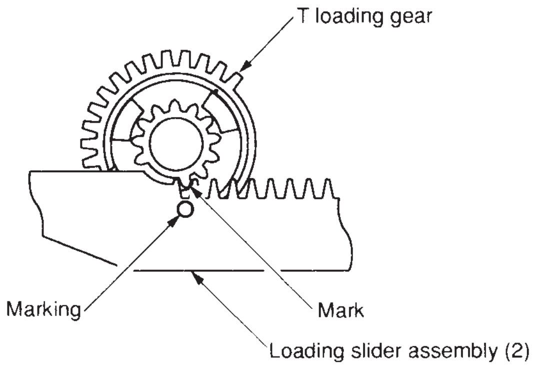

T loading gear
Marking
Mark
Loading slider assembly (2)

Fig. 6-24-2

1-6-25. Hook Lever Assembly Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Replacement".)
3. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
4. Remove the tension spring (1).
5. Turn the hook lever assembly (2) counterclockwise slightly, and remove the claw on the hook lever assembly (2) then replace.
6. After replacing the hook lever assembly (2) , insert the (A) portion of the hook lever under the S reel table assembly. When the portions (B), (C), (D) are in line, push the claw into the mechanical deck.

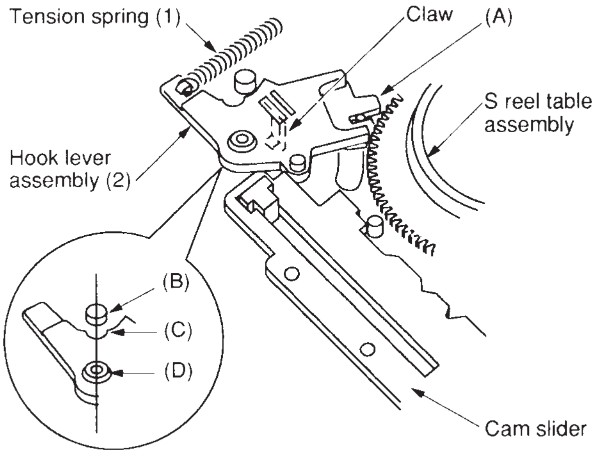

Tension spring (1)
Claw
(A)
S reel table assembly
Hook lever assembly (2)
(B)
(C)
(D)
Cam slider

Fig. 6-25-1

7. Turn the hook lever assembly (2) clockwise till it stops, and mount the tension spring (1). After replacing the hook lever assembly (2), slide the cam slider in the direction shown by the arrow, and then position the boss (E) under the cam slider.

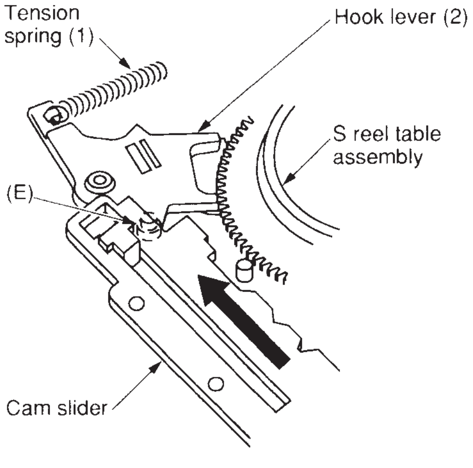

Tension spring (1)
Hook lever (2)
S reel table assembly
(E)
Cam slider

Fig. 6-25-2

1-6-26. Hook Replacement

1. Remove the hook lever assembly. (Refer to item "1-6-25. Hook Lever Assembly Replacement".)
2. Turn over the hook lever assembly (1) and remove the hook lever assembly (1) opening the portion (A) of the hook (2) slightly and lifting the hook (2) upward.
3. When mounting a new hook, push the hook (2) in the portion (B) from above.

Note:

- Take care not to confuse the mounting direction of the hook (2).

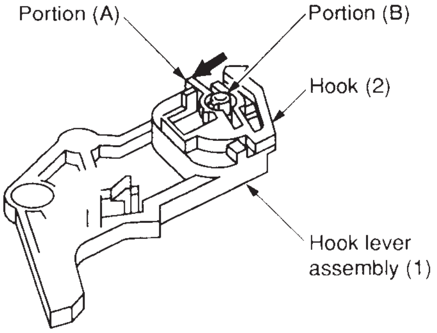

Portion (A)
Portion (B)
Hook (2)
Hook lever assembly (1)

Fig. 6-26-1

1-6-27. Tension Drive Lever Replacement

1. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement".)
2. Turn over the mechanical deck and remove the tension drive lever (1) from the projection (A) moving counterclockwise slightly.
3. After replacing the tension drive lever (1) , mount in the reverse order of removal.

Note:

- For the cam slider mounting, refer to the notes in item 1-6-40.

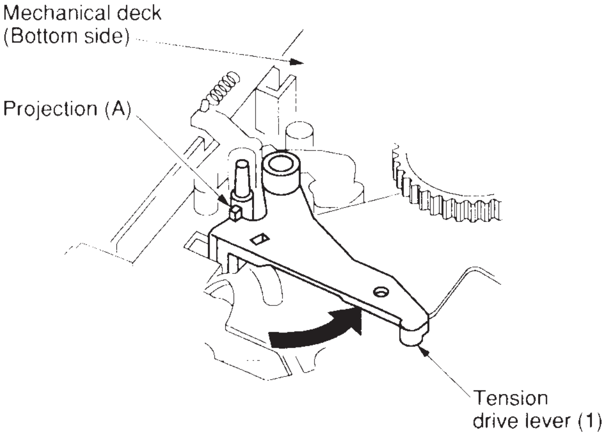

Mechanical deck (Bottom side)
Projection (A)
Tension drive lever (1)

Fig. 6-27-1

1-6-28. Loading Drive Assembly Replacement

1. Remove the F/L ground plate and the head cleaner assembly. (Refer to item "1-6-13. Head Cleaner Assembly Replacement".)
2. Remove two flat cables (1) from the connectors.
3. Pull out the portion (A) (No. 8 guide cap) from the motor bracket (2).
4. Remove four claws (a), (b), (c), (d) securing the motor bracket in the order of (a) → (b) → (c) → (d).

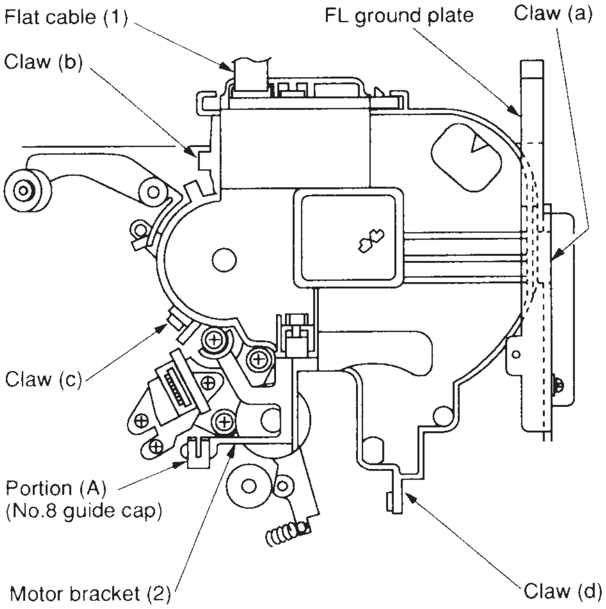

Flat cable (1)
FL ground plate
Claw (a)
Claw (b)
Claw (c)
Portion (A) (No.8 guide cap)
Motor bracket (2)
Claw (d)

Fig. 6-28-1

Note:

- Remove the claw (a) inserting a driver.
- Remove the claws (b) and (c) pushing inside previously and opening the claws slightly.

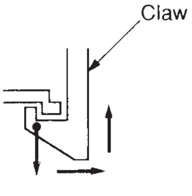


Fig. 6-28-2

<Preparation for Loading drive assembly mounting >

a) Confirm that the head cleaner assembly is removed.

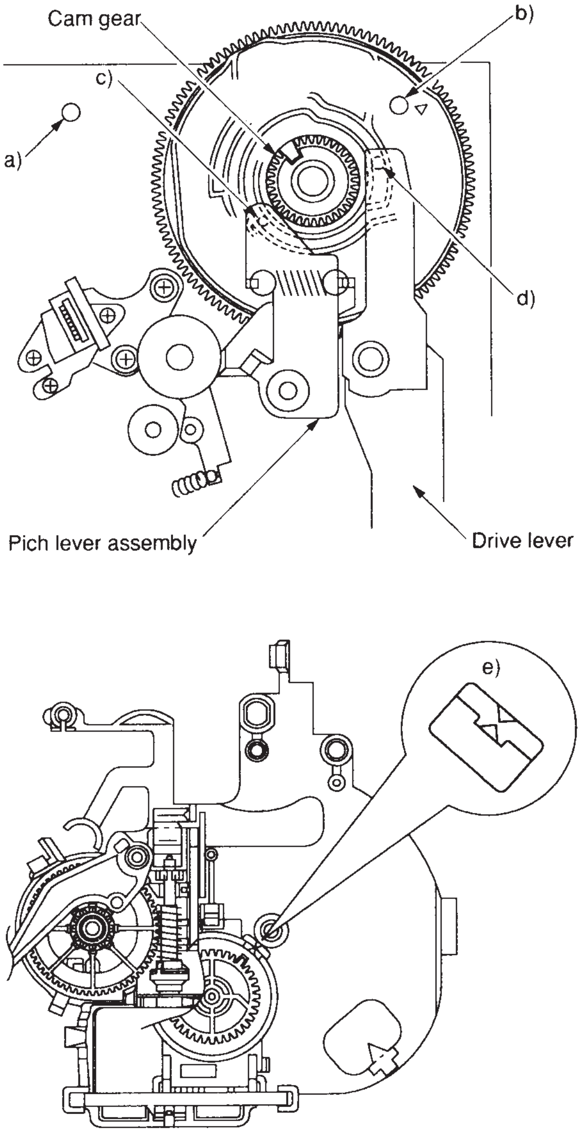
b) Confirm that the small hole b) on the cam gear aligns with the hole on the mechanical deck.

c) Confirm that the clearance between the pinch lever assembly and the cam gear is approx. 0.3 mm. (Confirm that the pinch lever assembly is correctly mounted on the groove of the cam gear.)

d) Confirm that the clearance between the drive lever and the cam gear is approx. 2 mm. (Confirm that the drive lever is correctly mounted on the groove of the cam gear.)

e) Confirm that the Δ mark on the rotor of the cam switch aligns with the Δ mark on the motor bracket.

5. After completion above steps a) to e), mount the loading drive assembly. Push four claws to the motor bracket in the order of (d) → (c) → (b) → (a) and push the portion (A) (No. 8 guide cap) into the motor bracket.
6. Confirm that the Δ mark on the rotor of the cam switch aligns with that on the bracket when the hole b) on the cam gear aligns with the hole on the mechanical deck. If the alignment of the Δ marks cannot be confirmed, remove loading drive assembly once again and reinstall after confirming the above steps a) to e).
7. Mount two flat cables.
8. Mount the F/L ground plate and the head cleaner assembly.

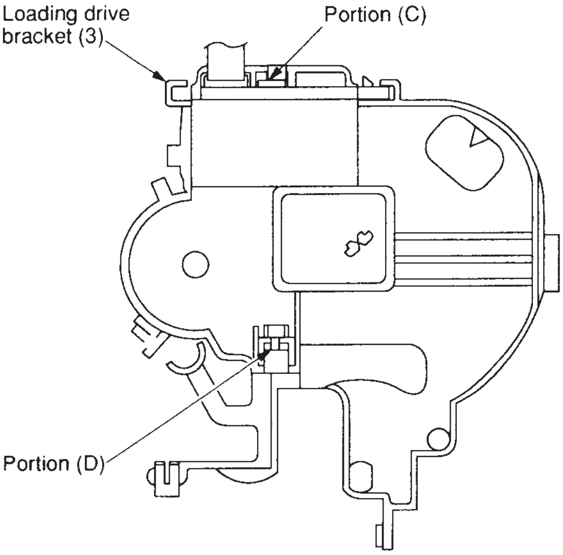


Loading drive assembly bottom side

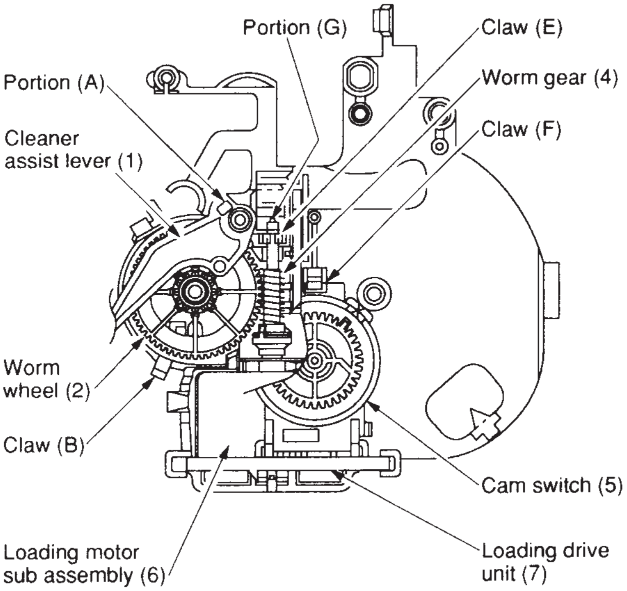
Fig. 6-28-3

1-6-29. Loading Motor Sub Assembly, Cam Switch and Loading Drive Unit Replacement

1. Remove the loading drive assembly. (Refer to item "1-6-28. Loading Drive Assembly Replacement".)
2. Remove the cleaner assist lever (1) from the claw (A).
3. After removing the cleaner assist lever (1), the worm wheel can be also removed upward.
4. Insert a slot-type screwdriver into the portion (C) of the loading drive bracket (3) and push the loading motor 2 – 3 mm lower. And push the tip of worm gear from the portion (D) of the loading bracket (3), then remove the worm gear (4) from the claw (E).
5. Remove the cam switch (5) from the claw (F) on the loading drive bracket (3) and pull out the loading drive unit (7) and the worm gear (4) simultaneously.
6. Replace the loading drive unit (7). When mounting the PC boards of the cam switch (5) and the loading drive unit (7), take care that no clearance is allowed.
7. Insert the loading drive unit (7) and the worm gear (4) into the loading drive bracket (3).
8. Push the tip (G) of the worm gear (4) into the claw (E) on the loading motor bracket.
   In this process, take care not to bend the tip of the worm gear with strong pressure.
9. Push the cam switch (5) into the claw (F) on the loading motor bracket.
10. Mount the parts in the reverse order of removal.


Loading drive bracket (3)
Portion (C)
Portion (D)

Loading drive assembly (Top Side)


Portion (G)
Claw (E)
Portion (A)
Worm gear (4)
Cleaner assist lever (1)
Claw (F)
Worm wheel (2)
Claw (B)
Cam switch (5)
Loading motor sub assembly (6)
Loading drive unit (7)

Loading drive assembly (Bottom side)

Fig. 6-29-1

1-6-30. Cam Gear Replacement

1. Remove the loading drive assembly. (Refer to item "1-6-28. Loading Drive Assembly Replacement".)
2. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement".)
3. Remove the drive lever. (Refer to item "1-6-39. Drive Lever Replacement".)
4. Remove the pinch roller assembly. (Refer to item "1-6-20. Pinch Assembly Replacement".)
5. Remove the cam gear.
6. Apply grease on a new cam gear on the shaded portion as shown in Fig. 6-30-1 and the shaft of the main base.

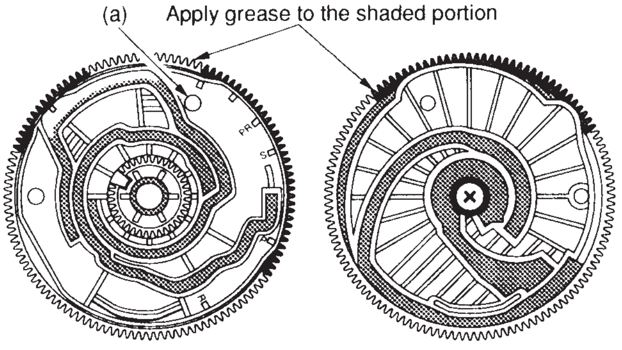

(a)
Apply grease to the shaded portion

Fig. 6-30-1

7. Make the S, T slider to the slot out condition.
8. Push the cam lever (1) and the pin (2) (loading slider) in the direction shown by the arrows (A) and (B).
9. Mount the cam gear at the angle which the small hole (a) on the cam gear aligns with the hole on the mechanical deck. (Refer to Fig. 6-30-1.)

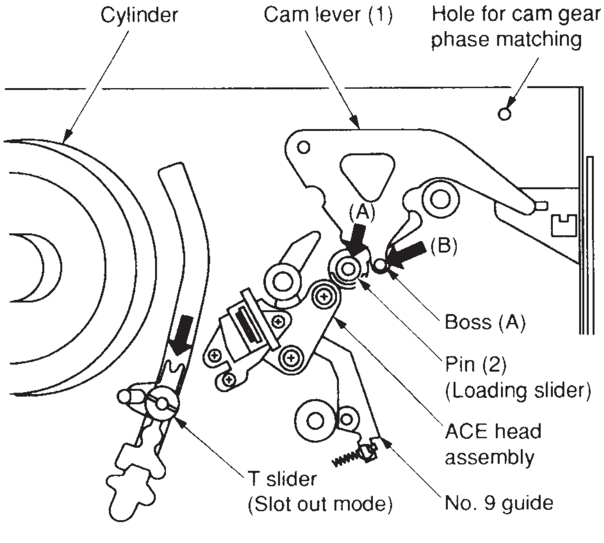

Cylinder
Cam lever (1)
Hole for cam gear phase matching
(A)
(B)
Boss (A)
Pin (2)
(Loading slider)
ACE head assembly
T slider
(Slot out mode)
No. 9 guide

Fig. 6-30-2

10. Mount the parts in the reverse order of removal.

1-6-31. S Reel Table Assembly and Washer 2 Replacement

1. Remove the top bracket and the cassette holder assembly. (Refer to item "1-6-1. Top Bracket Replacement and 1-6-2. Cassette Holder Assembly Replacement".)
2. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement".)
4. Remove the S soft brake and S main brake assembly. (Refer to item "1-6-37. S Soft Brake Replacement and 1-6-36. S Main Brake Assembly Replacement".)
5. Remove the tension lever assembly. (Refer to item "1-6-22. Tension Lever Assembly Replacement".)
6. Remove the S reel table assembly (1) pulling it out upward.
7. Remove the washer 2 (2).
8. After cleaning the reel shaft (3) with a cleaning kit, insert a new washer 2 (2) to the reel shaft (3) and apply a drop of oil to the shaded portions (two locations) on the reel shaft (3).
9. After replacing, mount the parts in the reverse order of removal.
10. Confirm the reel torque using a torque cassette.

Note:

- The washer 2 (2) can use repeatedly.

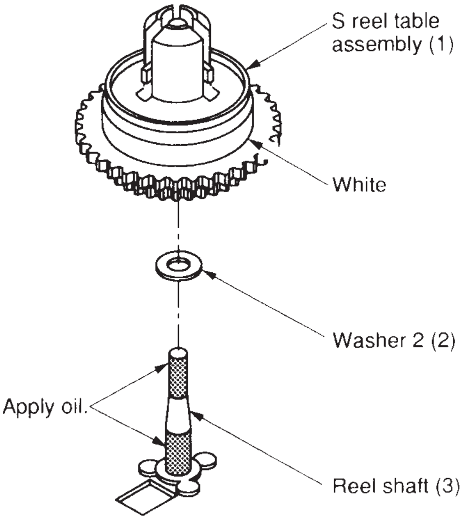

S reel table assembly (1)
White
Washer 2 (2)
Apply oil.
Reel shaft (3)

Fig. 6-31-1

1-6-32. T Reel Table Assembly and Washer 2 Replacement

1. Remove the top bracket and the cassette holder assembly. (Refer to item "1-6-1. Top Bracket Replacement and 1-6-2. Cassette Holder Assembly Replacement".)
2. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
3. Remove the T soft brake and T main brake assembly (Refer to item "1-6-40. Cam Slider Replacement".)
4. Remove the T reel table assembly (1) pulling it out upward.
5. Remove the washer 2 (2).
6. After cleaning the reel shaft (3) with a cleaning kit, insert a new washer 2 (2) to the reel shaft (3) and apply a drop of oil to the shaded portions (two locations) on the reel shaft (3).
7. After replacing, mount the parts in the reverse order of removal.
8. Confirm the reel torque using a torque cassette.

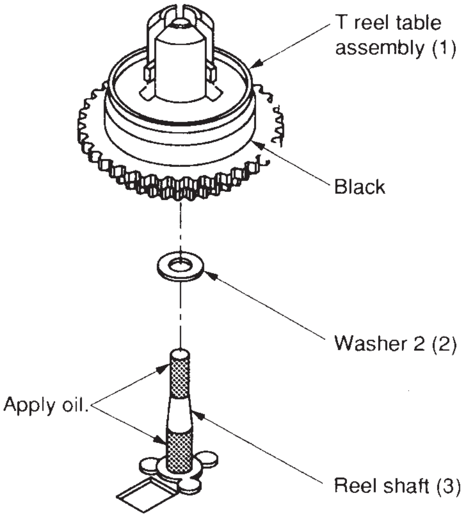

T reel table assembly (1)
Black
Washer 2 (2)
Apply oil.
Reel shaft (3)

Fig. 6-32-1

Note:

- Washer 2 (2) can use repeatedly.

1-6-33. Idle Arm Assembly Replacement (Center Gear Pulley, Idle Kick Lever, Idle up/down Lever)

1. Remove the mechanical deck from the main PC board.
2. Remove the stop ring (1) turning over the mechanical deck.
3. Remove the center gear pulley (2) lifting it upward.
4. Remove the claw (A) on the idle kick lever (3) moving and pulling it upward.
5. Remove the slit washer (4).
6. Remove the idle up/down lever (5) and the idle arm (6) simultaneously from two claws (B) on the mechanical deck.
7. After cleaning the center gear post (7) using a cleaning kit, apply a few drops of oil to the shaded portion on the center gear post.
8. Mount the parts in the reverse order of removal.

Note:

- Stop ring (1) is impossible to use again.
- When mounting the parts, take care of the notice shown in Fig. 6-33-2.

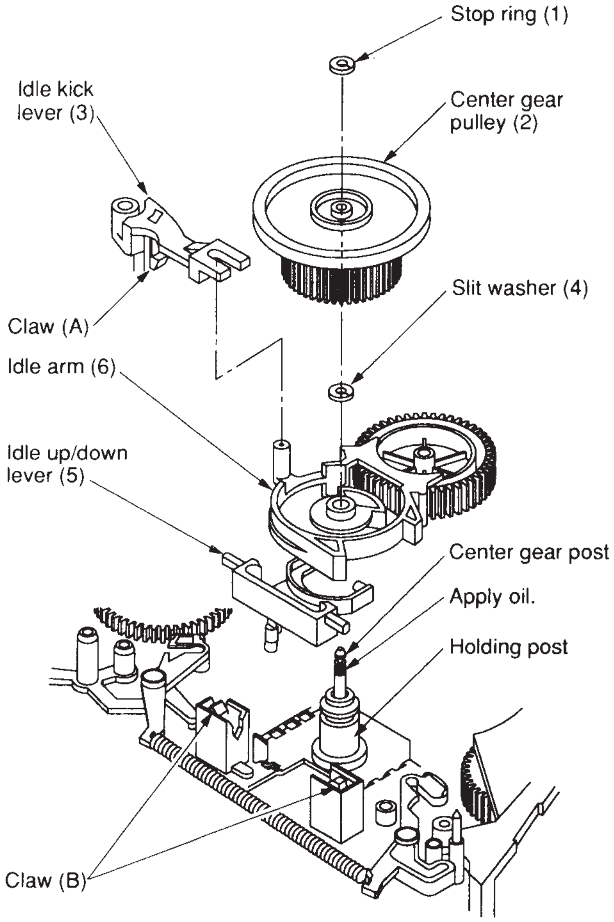

Stop ring (1)
Idle kick lever (3)
Center gear pulley (2)
Slit washer (4)
Claw (A)
Idle arm (6)
Idle up/down lever (5)
Center gear post
Apply oil.
Holding post
Claw (B)

Fig. 6-33-1

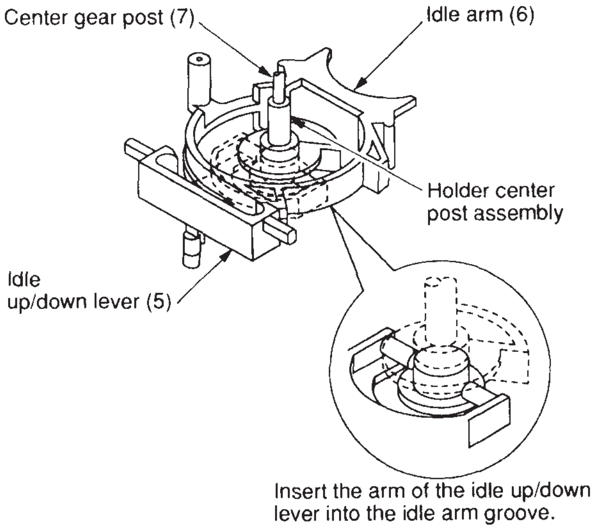

Center gear post (7)
Idle arm (6)
Holder center post assembly
Idle up/down lever (5)
Insert the arm of the idle up/down lever into the idle arm groove.

Fig. 6-33-2

1-6-34. Holder Center Post Assembly Replacement

1. Turn over the mechanical deck and remove the center gear pulley and the idle arm. (Refer to item "1-6-33. Idle Arm Assembly Replacement".)
2. Turn over the mechanical deck and remove the top bracket and the cassette holder assembly. (Refer to item "1-6-1. Top Bracket Assembly Replacement and 1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
4. After removing two screws (1), replace the holder center post assembly (2).
5. After replacing, mount the parts in the reverse order of removal.

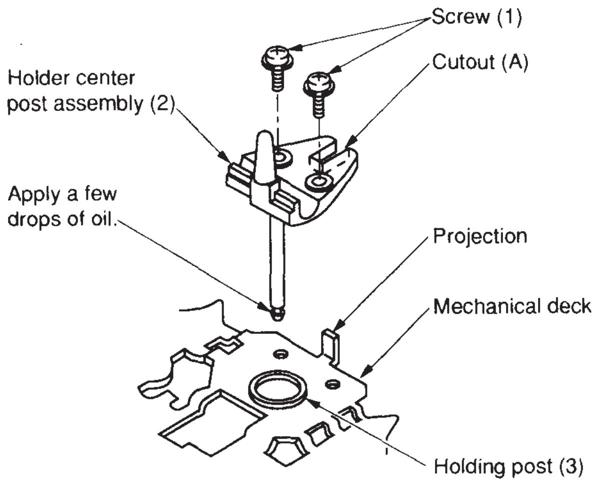

Screw (1)
Cutout (A)
Holder center post assembly (2)
Apply a few drops of oil.
Projection
Mechanical deck
Holding post (3)

Fig. 6-34-1

Note:

- When mounting, push the cutout (A) on the holder center post assembly (2) aligning with the projection on the mechanical deck.
- Screw tightening torque is 294 – 392 mN•m (3 – 4 kg•cm).
- Before mounting the center gear pulley, apply a few drops of oil. (Refer to Fig. 6-33-1.)

1-6-35. REC Inhibiting Lever Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement".)
4. Remove the tension spring (2).
5. Undo the claw (A) on the S soft brake (1) sliding and lifting it upward.
6. Remove the projection (B) on the REC inhibiting lever (3) sliding in the direction shown by the arrow and lifting it upward.
7. After replacing the REC inhibiting lever (3), mount the parts in the reverse order of removal.

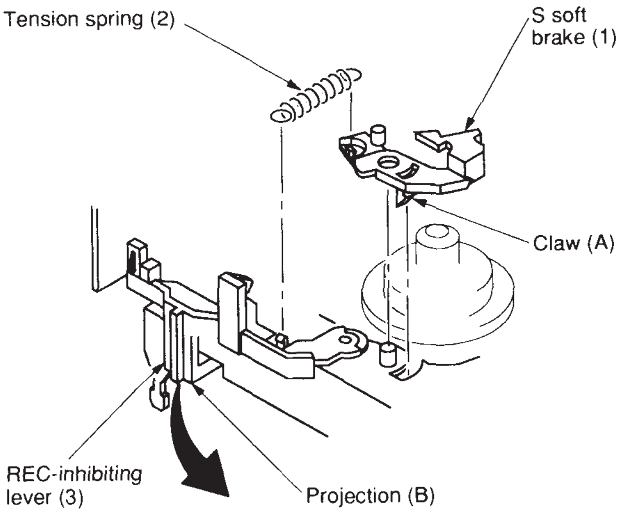

Tension spring (2)
S soft brake (1)
Claw (A)
REC-inhibiting lever (3)
Projection (B)

Fig. 6-35-1

1-6-36. S, T Main Brake Assembly Replacement

1. Remove the mechanical deck from the main PC board and turn the mechanical deck upside down.
2. When replacing the T main brake assembly (2), first remove the idle kick lever (3). (Refer to item "1-6-33. Idle Arm Assembly Replacement".)
3. Remove the tension spring (4).
4. Remove the claws on the S, T main brakes (1), (2) from the mechanical deck lifting the S, T main brakes (1), (2) upward.
5. After replacing the S, T Main brake assemblies (1), (2), mount the parts in the reverse order of removal.

Note:

- When mounting the S, T main brake assemblies (1), (2) take care that both ends of the S, T main brakes (1), (2), do not touch the gear of the reel table.

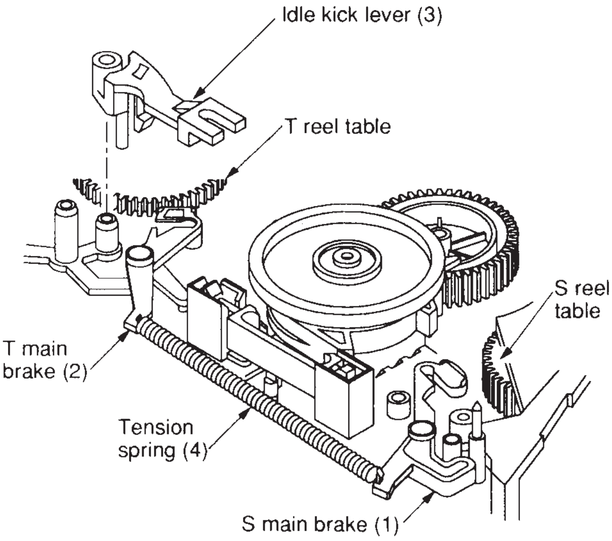

Idle kick lever (3)
T reel table
S reel table
T main brake (2)
Tension spring (4)
S main brake (1)

Fig. 6-36-1

1-6-37. S Soft Brake Replacement

1. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement.")
2. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
3. Remove the S soft brake spring (1).
4. Remove the S soft brake (2) after removing the claw (A) on the S soft brake from the mechanical deck.

Note:

- When mounting the S soft brake spring (1), take care not to deform the hook (B).
- When mounting the S soft brake (2), take care of the band brake (3).

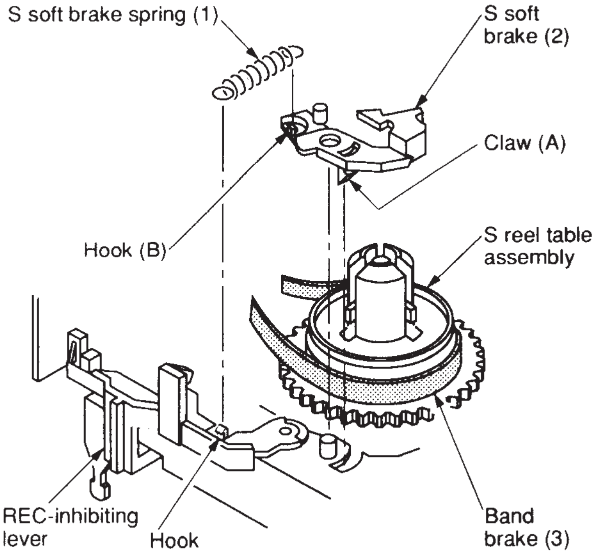

S soft brake spring (1)
S soft brake (2)
Claw (A)
Hook (B)
S reel table assembly
REC-inhibiting lever
Hook
Band brake (3)

Fig. 6-37-1

1-6-38. T Soft Brake Replacement

1. Remove the T soft brake spring (1).
2. Remove the claw (A) on the T soft brake (2) from the mechanical deck and remove the T soft brake (2).
3. After replacing the T soft brake (2), mount the parts in the reverse order of removal.

Note:

- When mounting the T soft brake spring (1), take care not to deform the hook (B).
- Take care not to touch the surface (C) on the brake pad.

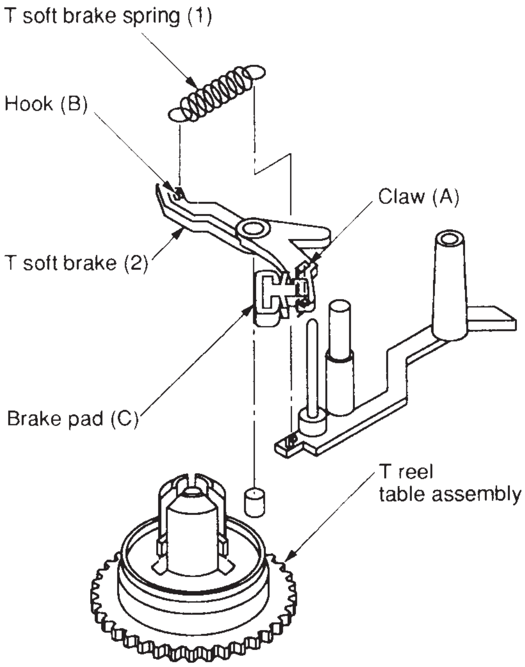

T soft brake spring (1)
Hook (B)
Claw (A)
T soft brake (2)
Brake pad (C)
T reel
table assembly

Fig. 6-38-1

1-6-39. Drive Lever Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
4. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement".)
5. Remove the Loading Drive Assembly. (Refer to item "1-6-28. Loading Drive Assembly Replacement.")
6. Remove the drive lever (1).
7. After replacing the drive lever (1), mount the parts in the reverse order of removal.

Note:

- Be sure to align the phase of the cam gear (2). (Refer to item 1-6-40. Cam Slider Replacement".)
- Mount the drive lever (1) so that it is positioned between the mark (A) on the mechanical deck and the outsert (B).
- Apply grease to the surface between the mark (C) on the mechanical deck and the drive lever shaft (D).

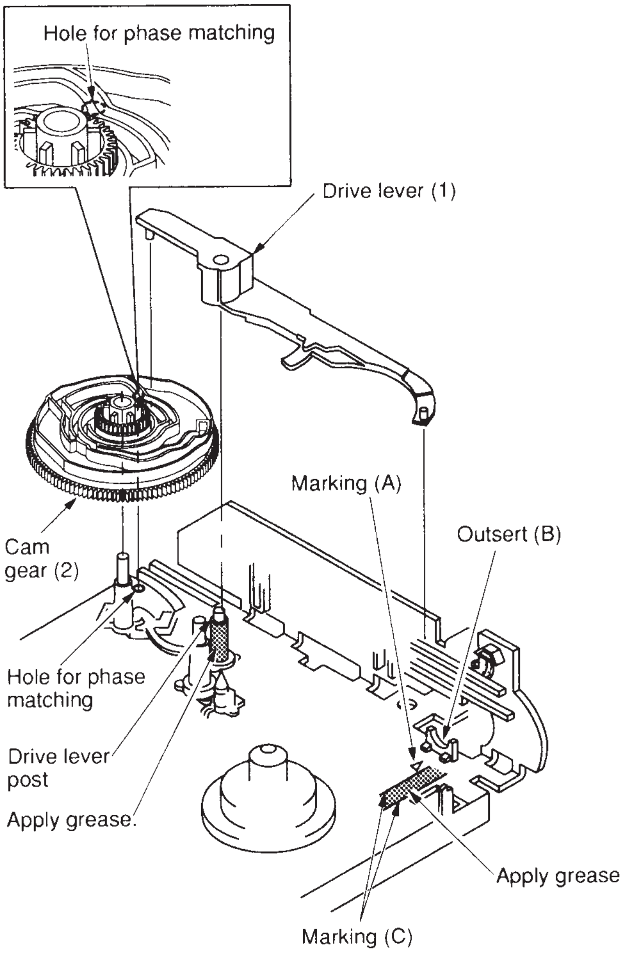

Hole for phase matching
Drive lever (1)
Marking (A)
Outsert (B)
Cam
gear (2)
Hole for phase
matching
Drive lever
post
Apply grease
Apply grease
Marking (C)

Fig. 6-39-1

1-6-40. Cam Slider Replacement

1. Remove the top bracket and the cassette holder assembly. (Refer to item "1-6-1. Top Bracket Replacement and 1-6-2. Cassette Holder Assembly Replacement".)
2. Remove the tension spring (1).
3. Turn the hook lever assembly (2) counterclockwise and turn the S soft brake (3) counterclockwise.
4. Move the cam slider (4) to the right and align the projection (A) on the mechanical deck and the cutout portion (B) on the cam slider (4).
5. Remove the claw (C) on the cam slider (4) and remove the cam slider (4) lifting the cam slider (4) upward.

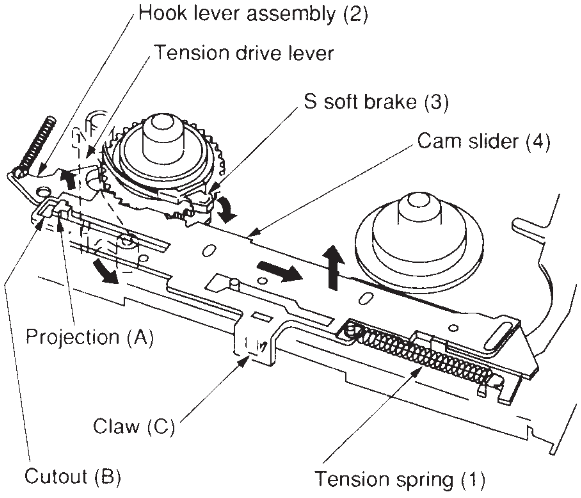

Hook lever assembly (2)
Tension drive lever
S soft brake (3)
Cam slider (4)
Projection (A)
Claw (C)
Cutout (B)
Tension spring (1)

Fig. 6-40-1

6. Apply grease on the shaded portion of a new slider for the replacement.
7. Mount the parts in the reverse order of removal. After inserting the cam slider, slide it to the left direction till it stops. (Fig. 6-25-2 shows this condition.)

Note:

- When mounting the cam slider (4), slide the tension drive lever in the direction shown by the arrow (counterclockwise).
- After completion of the replacement, confirm that the cam slider (4) can slide to left and right directions smoothly.

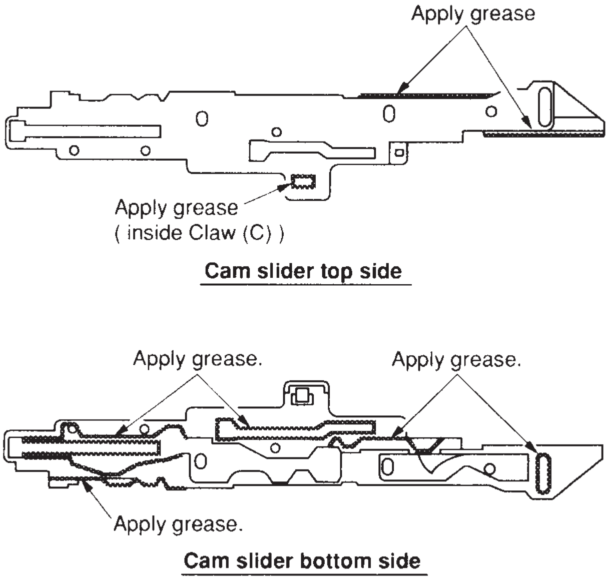

Apply grease
Apply grease
(inside Claw (C))
Cam slider top side
Apply grease.
Apply grease.
Apply grease.
Cam slider bottom side

Fig. 6-40-2

1-6-41. Idle Centering Lever Replacement

1. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement".)
2. Remove the claw on the idle centering lever (1) and remove the idle centering lever (1) lifting it upward.
3. After replacing the idle centering lever (1), mount the part in the reverse order of removal.

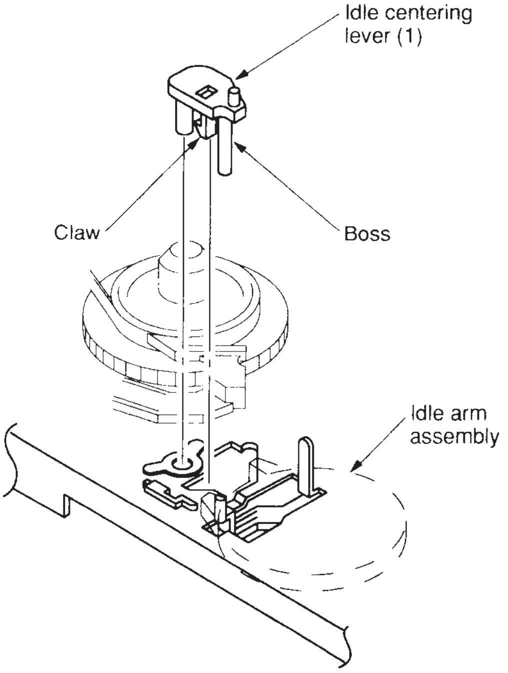

Idle centering lever (1)
Claw
Boss
Idle arm assembly

Fig. 6-41-1

1-6-42. Capstan Motor Replacement

1. Remove the reel belt (1).
2. Remove one screw (2) from the bottom of the mechanical deck, and remove the PC board (3).

Note:

- Take care not to misuse the screw with others.

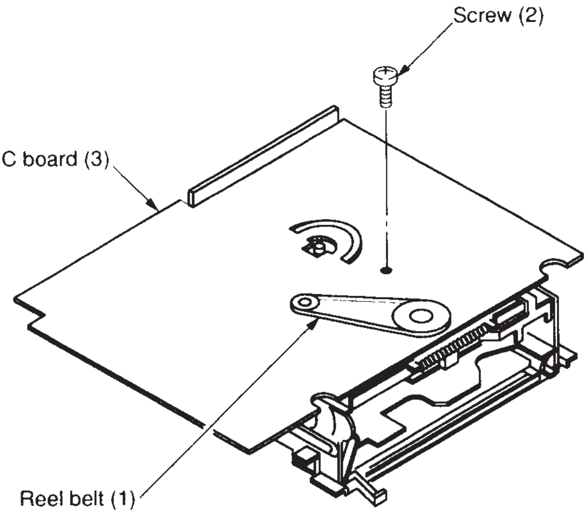

Screw (2)
PC board (3)
Reel belt (1)

Fig. 6-42-1

3. Remove the capstan motor (4) after removing three screws (5).

Note:

- Take care not to drop the capstan motor.

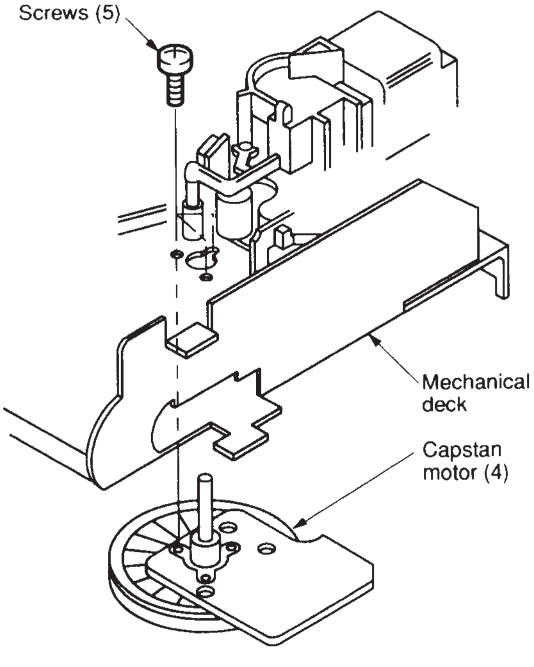

Screws (5)
Mechanical deck
Capstan motor (4)

Fig. 6-42-2

4. Take care not to damage and scratch the motor itself, and mount the capstan motor (4) fitting the hole (A) on the mechanical deck and the hole (B) on the capstan motor (4).

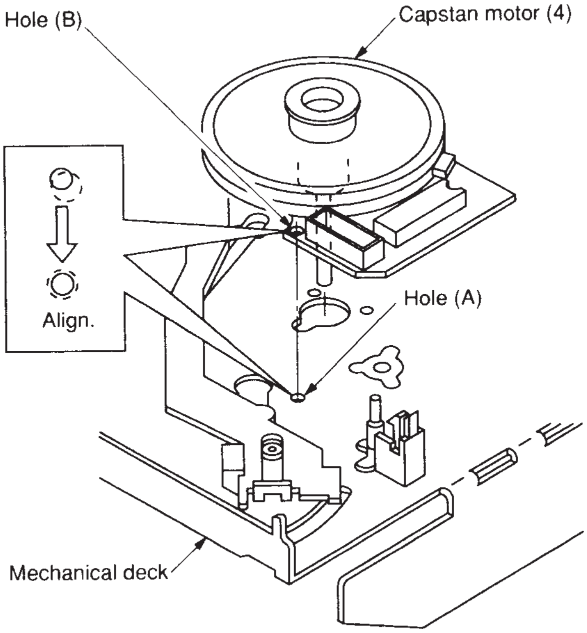

Hole (B)
Capstan motor (4)
Align.
Hole (A)
Mechanical deck

Fig. 6-42-3

5. Mount the capstan motor (4) with three screws (5) viewing from the top side of the mechanical deck.

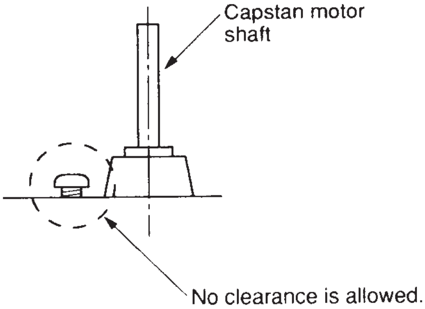

Capstan motor shaft
No clearance is allowed.

Fig. 6-42-4

Note:

- Do not use once-removed screws again.
- Take care that no clearance is allowed when securing three screws.

6. After replacement, mount the parts in the reverse order of removal.

Note:

- In this case, take care not to twist the reel belt and stick the grease or etc. on it.

7. After replacing, perform the adjustment according to the tape transport adjustment procedures.

1-6-43. S-VHS Switch Assembly Replacement (S-VHS model only)

1. Slide the cassette holder assembly (1) until the screw (2) can be seen from the hole on the top bracket (3).
2. Insert a screwdriver from the hole provided on the top bracket (3) and secure the screw (2).
3. Remove the S-VHS switch assembly (4) upward.
4. After completion of the replacement, mount the parts in the reverse order of removal.

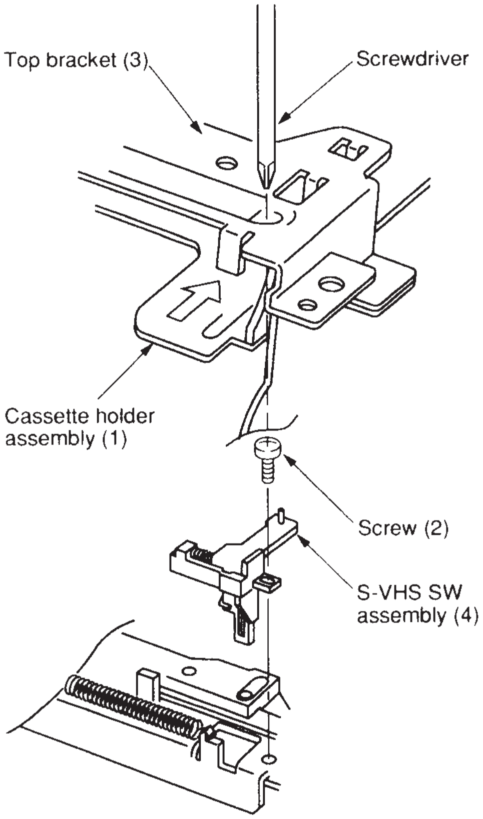

Top bracket (3)
Screwdriver
Cassette holder assembly (1)
Screw (2)
S-VHS SW assembly (4)

Fig. 6-43-1

1-7. Check and Adjustment

1-7-1. Check of Tension Pole Position

1. Turn the worm wheel counterclockwise after removing the cassette holder assembly on the front loading mechanism, and set the cam gear at playback position.
2. Turn the S reel table assembly (1) clockwise slowly.
3. Adjust the adjuster (3) counterclockwise from the position shown in Fig. 6-22-1 so that the clearance between the left end of the tension lever assembly (2) and the left side of the mechanical deck becomes 7.5 ± 1 mm.

Note:

- There is a long mark at the position of 7.5 mm from the round surface of the mechanical deck. Make sure the position of the mark when adjusting.

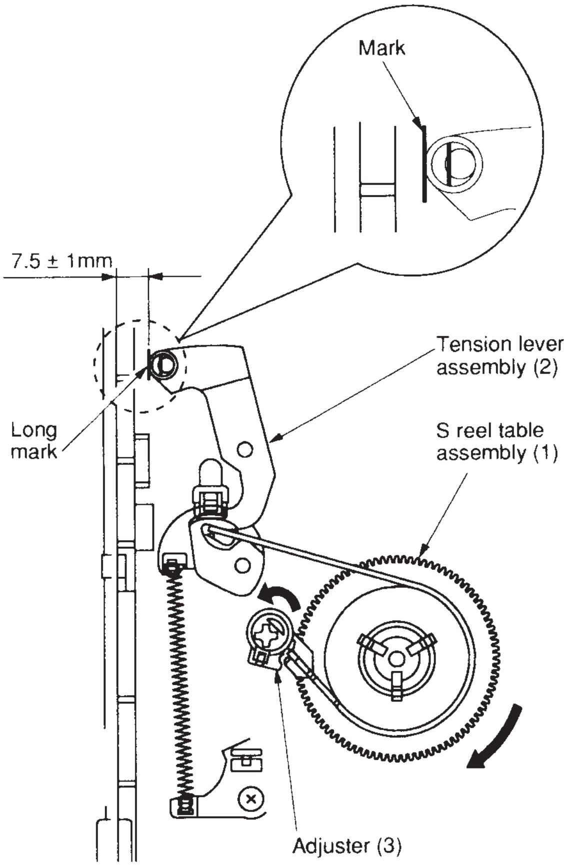

Mark
7.5 ± 1mm
Tension lever assembly (2)
Long mark
S reel table assembly (1)
Adjuster (3)

Fig. 7-1-1

1-7-2. Reel Torque Check

(1) Reel torque

1. REVIEW mode (supply side)

   Poor torque may not wind the tape. On the other hand, excessive torque will cause damage to the tape during REVIEW mode.

2. Record/Playback mode (take-up side)

   Too little torque does not rewind the tape to the end. If too large torque, the tape may be stretched by excessive tension.

3. Inspection

   Rewind the torque cassette to the end, then check the torque values shown below:

Review	15.95 ± 3.65 mN•m (162.5 ± 37.5 g•cm)
Record/Playback	6.85 ± 2.45 mN•m (70 ± 25 g•cm)

   For checking method, refer to the following item (2).

(2) Reel torque and back tension check

1. First, record a TV broadcast program on the entire torque cassette tape (KT-300NR) in the SP mode.
2. Load the torque cassette tape (KT-300NR) in the VTR and feed it forward until the end of the tape, before proceeding with measurement.
3. Set the VTR to the REVIEW mode and feed the tape for about 15s, and then make sure the take-up torque described above is obtained while observing the left torque meter.
4. After completion of step 3), feed forward to tape start position and set the VTR to the PLAY mode and feed the tape for about 30s. Read the right torque meter and check the torque described above is obtained.
5. If the review torque and playback torque are out of limit, replace the clutch assembly.
6. When the S reel table assembly, the T reel table assembly and the idle arm assembly are replaced, perform the reel torque check.

<Precautions for Use of Torque Cassette (KT-300NR)>

1. Before loading a torque cassette in a VTR, always remove tape slack. The tape slack can be removed by rotating the reel to its take-up direction. (The tape tends to slack when there is no reel brake actions.)
2. When the torque cassette is loaded, confirm followings:
   - Make sure the tape does not ride up or over the No. 8 cap. If it does, do not eject the tape but return the tape to its correct position, taking care not to damage the tape.
   - Make sure the tape is not slackened. If slackened, operate the VTR in FF or REW mode and then stop the tape. Then make sure the tape is not slackened again.
   - After above confirmation, proceed to the reel torque adjustment and confirmation.
3. Caution for removal of torque cassette
   - When removing the torque cassette from the VTR, set the VTR to the STOP mode and wait for several seconds. Then, make sure the tape is not slackened. Push the EJECT button to remove the cassette.
4. If the previous precautions 1), 2) and 3) are not performed properly, the tape may be damaged and correct measurements can not be performed.
5. Do not use worn out or damaged tape, if used they may damage video heads on the cylinder. In such a case always replace the tape with a new one. The replacement tape is of E-180, 10 m in length.

1-7-3. Tape Transport System

The tape transport system has been precisely adjusted in the factory, so no check and alignment are necessary except the followings:

- Noises observed on the screen
- Tape damage
- Parts, shown in the adjustment procedures for the tape transport system were replaced.

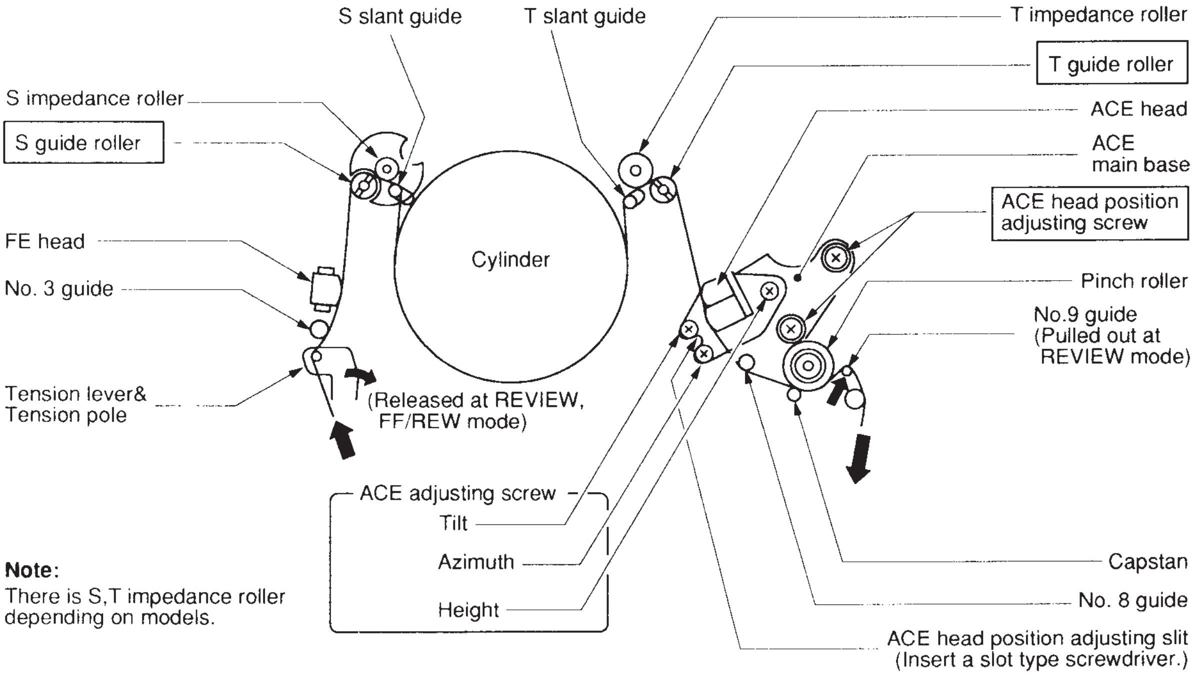
Electrical signal output terminal required for adjustment differs depending upon the models. Refer to the test point location in the Electrical Adjustment Section.

(1) Location of tape transport adjustment

<Adjustment reference>

Lower flange height of No. 8 guide is used as the basic reference for the transport adjustment. To keep height of the No. 8 guide, do not apply excessive force onto the main base to prevent the main base from deformation.

Rectangles shown in Figs. 7-3-1, 7-3-2 show the adjusting locations.


S slant guide
T slant guide
T impedance roller
T guide roller
S impedance roller
S guide roller
ACE head
ACE main base
ACE head position adjusting screw
FE head
Cylinder
No. 3 guide
Pinch roller
No.9 guide (Pulled out at REVIEW mode)
Tension lever& Tension pole
(Released at REVIEW, FF/REW mode)
ACE adjusting screw
Tilt
Azimuth
Height
Capstan
No. 8 guide
ACE head position adjusting slit (Insert a slot type screwdriver.)

Note:
There is S,T impedance roller depending on models.

Fig. 7-3-1 Tape travel diagram

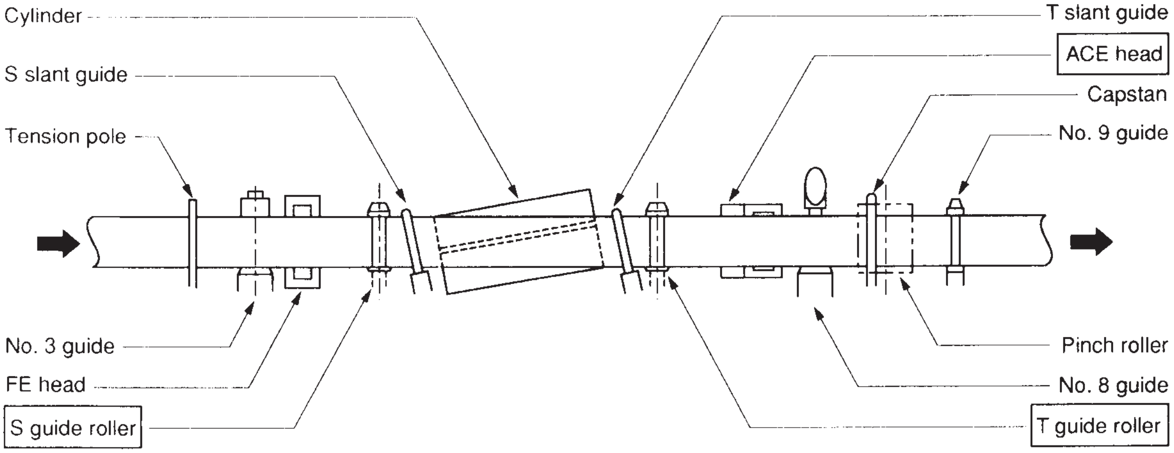

Cylinder
S slant guide
Tension pole
T slant guide
ACE head
Capstan
No. 9 guide
No. 3 guide
FE head
S guide roller
Pinch roller
No. 8 guide
T guide roller

Fig. 7-3-2 Location of tape transport adjustment

(2) Tape transport system adjustment flow chart

Cylinder assembly replacement

S, T slider replacement

ACE head assembly replacement

Capstan motor assembly replacement

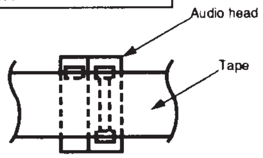
Pinch lever assembly replacement

Cylinder motor replacement

1) ACE head assembly coarse adjustment

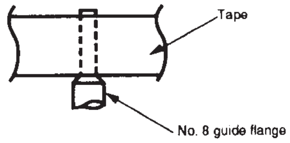
1. AUDIO HEAD HEIGHT ADJUSTMENT (AUDIO HEIGHT ADJUSTING SCREW)

Playback the tape recorded in SP mode. Adjust position of the upper flange of tape and that of the audio head.



2. AUDIO HEAD TILT ADJUSTMENT (TILT ADJUSTING SCREW)

Playback the tape in SP mode continuously. Adjust Audio head tilt screw so that tape transports along lower flange of No. 8 guide.



3. AUDIO AZIMUTH ADJUSTMENT (AZIMUTH ADJUSTING SCREW)

Playback 7 kHz audio signal on alignment tape and adjust for max. output.

4. ACE HEAD POSITION ADJUSTMENT

Playback video envelope signal 3 MHz (A ch) on alignment tape in SP mode. Set tracking control at its center. Adjust ACE main base to obtain max. output.

Upper cylinder assembly replacement

2) Playback phase adjustment

Adjust as described in the Electrical Adjustment Section (Servo circuit.) in each service data.

S, T guide roller replacement

Tension lever assembly replacement

Impedance roller replacement

FE head replacement

3) Linearity adjustment (S, T guide roller)

(Note 1)

1. MAXIMUM ENVELOPE OUTPUT

Playback the 3 MHz video signal on the alignment tape.
Trigger scope with switching pulse.
Adjust tracking control for maximum envelope output by pushing channel (tracking) up/down buttons.

2. ENTRANCE SIDE ENVELOPE ADJUSTMENT

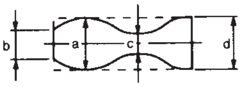
Rotate S guide roller until entrance side envelope becomes as flat as possible.

3. EXIT SIDE ENVELOPE ADJUSTMENT

Rotate T guide roller until exit side envelope becomes as flat as possible.

4. LINEARITY CHECK

Press the channel (tracking) up/down buttons alternately, make sure envelope increases or decreases with flat response kept.



$c/a \geqq 0.75$ } (S-VHS model)
$b, d/a \geqq 0.63$

$b, c, d/a \geqq 0.75$ (Non S-VHS model)

(Note 1) For the linearity adjustment, make sure adjusted value should be checked with 3 MHz (SP) video signal after completion of specified adjustments using 3 MHz (LP) video signal in alignment tape.

Reel clutch assembly replacement

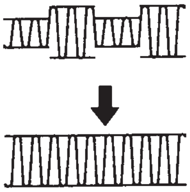
Reel table replacement

Taper nut replacement

4) ACE haed assembly fine adjustment

1. ACE HEAD HEIGHT FINE ADJUSTMENT

Playback stereophonic alternative recording signal (300-500Hz) on alignment tape.
Turn the Audio height adjusting screw until audio envelope signal becomes as flat as possible.



2. AUDIO HEAD TILT FINE ADJUSTMENT

Playback alignment tape in CUE or double speed mode.
Adjust Audio head tilt untill tape runs along lower flange of No. 8 guide.

3. ACE HEAD HEIGHT FINE ADJUSTMENT

Playback alignment tape as described in step 1, make sure audio envelope signal becomes as flat as possible

NG

OK

4. AUDIO HEAD AZIMUTH FINE ADJUSTMENT

Playback 7 kHz audio signal on alignment tape.
Turn the azimuth adjusting screw to obtain maximum output.

5. AUDIO HEAD HEIGHT CHECK

Repeat same step as step 3.

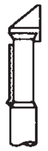
NG

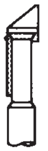
OK

5)

No. 9 guide lever check

1. TAPE WRINKLE CHECK
- Playback E-240 tape in Review mode.
- Confirm the portion of upper/lower flange on No.8 guide.


(A)


(B)

2. NO. 9 GUIDE

If tape travels out of upper/lower flange as shown above, pinch lever or capstan motor or No.9 guide lever is defective.
Replace the defective part(s).

6)

Check for transitional operation

1. Playback 3 MHz video signal (LP mode) in alignment tape and set review mode.
2. Change mode from review to play and check entrance side envelope rises within 3s. Check entrance side envelope rised within 3s, when mode is changed from slot-in to play.

OK → 7)

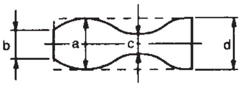
NG

3. Adjust S guide roller to readjust linearity.
4. Check step 2 and 3 if no good, replace S slider assy or tension lever.

7)

Recorded & reproduced envelope check

- Records signals in SP & LP modes, using E-180, E-240 tape and playback them to check envelopes.



c/a ≧ 0.75
b, d/a ≧ 0.63
} (Non S-VHS model)

b, c, d/a ≧ 0.75 (S-VHS model)

8)

Tape damage check

- Run E-240 tape in each mode and check there is no damage at each guide.

Playback mode
- Guide roller section damage
  - Back to step 3) linearity adjustment. (or Slider assembly replacement)
- Damage at No.8 guide brush
  - Back to step 1) ACE head assembly coarse adjustment. (or Pinch lever replacement)
- Damage at No.1 guide lower flange
  - Back to step 6) check for transitional operation. (or Tension lever replacement)

Review
- Damage at No.8 guide flange
  - Back to step 5) No.9 guide lever check or 1) ACE head assembly coarse adjustment. (Pinch lever, No.9 lever, Capstan motor replacement)
- Damage at guide roller section
  - Back to step 3) linearity adjustment. (or Slider assembly replacement)

Frame advance mode
- Damage at No.8 guide flange
  - Back to step 3) linearity adjustment.

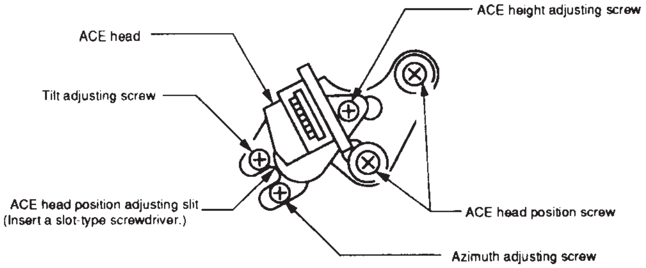
9) Checks for Hi-Fi models only.

AFM envelope output max. point check

Playback 3 MHz video signal. 400 Hz AFM signal in alignment tape ST-C7 in SP mode.

Check video envelope max. point (A ch).

Check control pulse phase difference is within ±3 ms from that point to AFM envelope max. point.



ACE head
ACE height adjusting screw
Tilt adjusting screw
ACE head position adjusting slit
(Insert a slot-type screwdriver.)
ACE head position screw
Azimuth adjusting screw

6. ACE HEAD POSITION
- Set tracking at its center position pushing channel (tracking) up/down buttons simultaneously.
- Playback 3 MHz video signal (LP mode) on the alignment tape. Slide ACE main base to obtain max. envelope.
- Playback 3 MHz (A ch) video signal (LP mode) on the alignment tape . Confirm that difference from tracking center is within 3 ms when maximum envelope is obtained.
- If not, readjust in LP mode.

* VTR applied SP mode only, Use 3 MHz (A ch) video signal (SP mode) instead of 3 MHz video signal (LP mode).

(3) Tape transport system adjustment

<Pre-adjustment>

When the part(s) listed in Table 7-3-1 is replaced, perform required adjustments by referring to procedures for the tape transport system. When the part(s) listed in Table 7-3-1 is replaced, the tape path may be changed and may damage alignment tape. To prevent this, first run a E-240 tape and make sure excessive tape wrinkle does not occur at each tape guide.

1. If tape wrinkle is observed at the S, T guide rollers, turn the S, T guide rollers until wrinkle disappears.
2. If tape wrinkle is observed at the No. 8 guide, perform the tilt adjustment of the ACE head.

Table 7-3-1

Parts replacement	Adjustment procedure
• Cylinder assembly • S, T sliders • ACE head • Pinch lever assembly • Capstan motor • No. 9 guide lever assembly	From item 1)
• Upper cylinder	From item 2)
• S, T guide rollers • Tension lever assembly • FE head	From item 3)
• Reel clutch assembly • S, T reel tables	From item 4)

<Adjustment procedures>

1) ACE head assembly coarse adjustment

a. Audio head height adjustment

1. Play back the tape recorded in the SP mode. Observe the surface of the ACE head.
2. Turn the ACE height adjusting screw so that upper tape edge matches to the upper edge of the audio head core.

b. ACE head tilt adjustment

1. Play back the tape recorded in the SP mode and observe running condition of the tape at the lower flange of No.8 guide.
2. Turn the ACE tilt adjusting screw until tape wrinkle is caused at the lower flange of No. 8 guide as shown in Fig. 7-3-4 (A).
3. Turn the ACE tilt adjusting screw counterclockwise until the tape travels along the lower flange as shown in Fig. 7-3-4 (B).

c. Audio head azimuth adjustment

1. Play back the 7 kHz audio signal on the alignment tape in the SP mode.
2. Connect a millivoltmeter or oscilloscope to the audio line output terminal.
3. Turn the ACE azimuth adjusting screw to obtain maximum audio output.

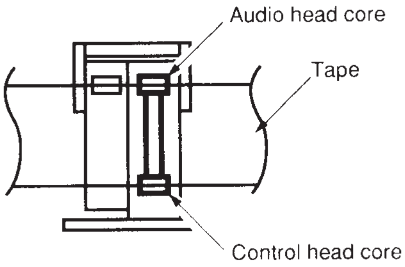


Fig. 7-3-3

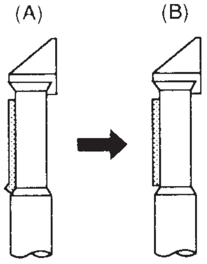


Fig. 7-3-4 No. 8 guide rough adjustment

d. ACE head position adjustment

1. Play back the 3 MHz video envelope signal in the alignment tape in the SP mode. Loosen the ACE head position securing screw.
2. Insert a slot-type screwdriver into the ACE head position adjusting slit on the ACE main base and adjust the ACE main base so that the video envelope reaches a peak level at the tracking center position when the channel (tracking) up/down buttons of VTR are pressed simultaneously.

2) Playback phase adjustment

1. Perform the adjustment according to the methods stated in the electrical adjustment (servo circuit).

3) Linearity adjustment

1. Play back the LP mode 3 MHz video signal on the alignment tape.

Note:

- For models SP mode only, use the 3 MHz (A ch) video siganl in the SP mode.

2. Trigger the scope with the switching pulse to issue the envelope signal output.
3. Make sure the video envelope waveform (in its maximum output) meets the specification shown in Fig. 7-3-5. Again make sure the same by playing back the SP mode 3 MHz video signal on the alignment tape. If not satisfied, adjust as follows:

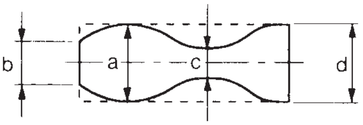
Note:

a = maximum output of the video RF envelope

b = minimum output of the video RF envelope at the entrance side

c = minimum output of the video RF envelope at the center point of cylinder

d = minimum output of the video RF envelop at the exit side of cylinder



c, b, d/a ≧ 0.75 (S-VHS model)

b, d/a ≧ 0.63 } (Non S-VHS model)
c/a ≧ 0.75

Fig. 7-3-5

4. If the (A) section in Fig. 7-3-6 does not meet the specifications, adjust the S guide roller in up or down direction.
5. If the (B) section in Fig. 7-3-6 does not meet the specifications, adjust T guide roller in up or down direction.

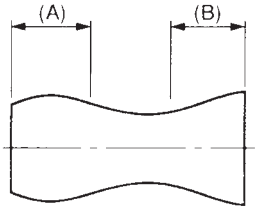


Fig. 7-3-6

6. After completion of the adjustment(s), push the channel (tracking) up/down button and make sure video envelope variations are almost flat.
   Next, play back the 3 MHz SP mode video signal on the alignment tape and makes the video RF envelope variations are also flat when channel (tracking) UP/DOWN buttons is pushed.
7. If the envelope varies like NG figures as shown in Fig. 7-3-7, perform the adjustment again.
   Smooth secondary curves are allowable level.

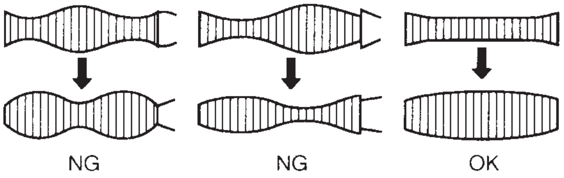


Fig. 7-3-7 Abnormal waveform variation

4) ACE head assembly fine adjustment

a. ACE head height fine adjustment

1. Play back the stereophonic alternative recording 300 – 500 Hz audio signal on the alignment tape.
2. Adjust the ACE height adjusting screw so that the signal envelope is obtained almost flat.

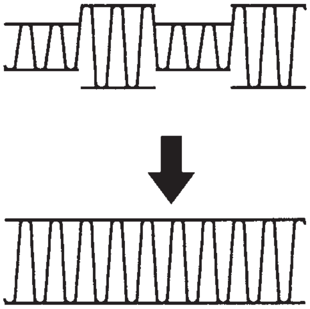


Fig. 7-3-8

Note:

- If there is no alignment tape (ST-C6, ST-C7), do not perform this item "a. ACE head height fine adjustment", and perform the process of the note in item "e. Audio head height check" described later.

b. ACE tilt adjustment

1. Observe the lower flange of No. 8 guide. If any wrinkle is observed, turn the ACE tilt adjusting screw counterclockwise until the wrinkle disappears.
2. If a gap is observed between the lower flange of No. 8 guide and the lower edge of tape, turn the ACE tilt adjusting screw clockwise until the tape travels along the lower flange.

Note:

- This adjustment is performed easily in SP mode playback, double speed playback mode or CUE mode.

c. Audio head height check

1. Play back the stereophonic alternative recorded 300 – 500 Hz audio signal as described in the step 4)-a, and check if the audio envelope is flat. If not, repeat the adjustment described in step 4)-a again.

d. Audio azimuth adjustment

1. Play back the 400 Hz, 7 kHz audio signal on the alignment tape.
2. Turn the ACE azimuth adjusting screw until the maximum audio output is obtained.

e. Audio head hight check

1. Play back the alignment tape desribed in step 4)-a and check if the audio envelope is flat. If not, repeat the adjustment described in step 4)-a.

Note:

- If there is no alignment tape (ST-C6, ST-C7), perform the audio height alignment using the current alignment tape at this adjustment step.

1. Playback the 400 Hz audio signal (SP mode) on the alignment tape.
2. Turn each three alignment screw of the ACE head to the same direction in 45 degrees steps evenly so that the audio output level becomes maximum.
3. Perform the confirmation and adjustment for the tilt and the azimuth again.

f. ACE head postion adjustment

1. Play back the 3 MHz video signal (LP mode) on the alignment tape.
2. Push the channel (tracking) up/down buttons simultaneously and reset the tracking at its center position.
3. Trigger the oscilloscope with the video switching pulse and observe the video envelope waveform.
4. Slide the ACE main base until the maximum envelope output is obtained as described in ACE head position coarse adjustment.
5. Play back the 3 MHz video signal (SP mode) on the alignment tape.
6. Make sure the envelope output is maximum when the tracking control is placed at its center position.

   If no envelope output is obtained with the tracking control set to the center position, again adjust it for maximum envelope output in SP and LP modes. When envelope output is maximum in the LP mode at the tracking center, difference with the case in the SP mode is within 3 ms.
7. Tighten the ACE head position fixing screw and secure the ACE main base.

g. After completion of ACE head fine adjustment, apply screw lock to two screws (tilt, azimuth adjusting screws) in front of the ACE head.

5) No. 9 guide lever adjustment

1. Set the VTR to Cue mode with E-240 tape (at beginning portion) loaded. Switch the Cue mode to the review mode when the tape has been rewound into the T-reel table to some extent.
2. Check tape wrinkle at the upper and lower flange of No. 8 guide. Check the tape does not come off from the flange while running. If the tape comes off from the flange, replace the pinch lever, capstan motor or No. 9 guide lever since the part(s) is (are) defective.

Note:

- Modify the lid of the cassette for the alignment tape E-240 previsously so that the alignment is performed easily.

6) Check for transitional operation from Review to Play, slot-in to play

1. Play back the LP mode white video signal on the alignment tape in Review mode and observe the video envelope with the oscilloscope.
2. Switch the Review mode to the Play mode. When switched to the Play mode, make sure the entrance side envelope comes to an approximate steady state within 3s as shown in Fig. 7-3-9.

If it does not rise within 3s, take the following steps starting 4).

3. Switch the cassette slot-in mode to the Play mode. As in item 2), if it does not rise within 3s, adjust as follows.

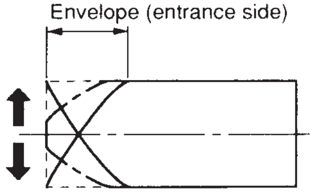


Fig. 7-3-9 Video envelope rising when operation mode is switched from review to play mode

4. Adjust the S guide roller and perform the linearity adjustment again.
5. Check above items 2) and 3) to see that the video envelope rises within 3s. If not, S slider assembly or the tension lever is damaged. Replace either (or both) of them.

Note:

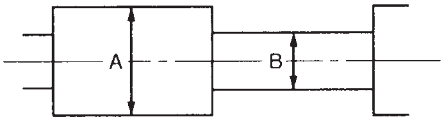
- If the rising characteristic is poor in Review mode, screen noise may occur in synchronous editing recording. Perform the adjustment carefully.

7) Envelope check

1. Make recordings and play back the tapes (E-180 and E-240) in SP and LP modes and make sure the playback output envelope meets the specifications shown in Fig. 7-3-5.
2. In playback the tape (with a E-180), the video envelope should meet the specification as shown in Fig. 7-3-10.

Note:

- Check for both modes, SP and LP. Also check for AFM envelope when using a Hi-Fi model.



- B/A ≧ 0.55
- B ≧ 120mV

Fig. 7-3-10 Envelope output and output difference

3. If the performance does not meet both specifications above 1 and 2 above, replace the upper cylinder assembly.
4. Set the VTR to Rec mode (LP) with the E-180 tape loaded (at the beginning part) and check operation of the synchronous editing recording.
5. If picture noises are observed at the starting position of the editing, perform "6) Check for transitional operation from Review to Play, slot-in to play".

8) Tape wrinkle check

1. Playback the E-240 tape in the normal Play mode, CUE mode, Review mode and the frame advance mode, and check each guide for wrinkle.
2. If excessive tape wrinkle is observed at the mode shown below, perform the associated adjustments also shown below. (The parts described in ( ) may need to replace.)

a. Playback mode

Tape wrinkle at the S, T-guide rollers section

Item 3) Linearity adjustment
(Slider assembly)

Tape wrinkle at No. 8 guide flange

Item 1) ACE head assembly coarse adjustment
(Pinch roller)

Tape wrinkle at lower flange of No. 1 guide

Item 6) Check for transitional operations from Review to Play, and Slot-In to Play
(Tension lever)

b. Review mode

Tape wrinkle at No. 8 guide

Item 1) ACE head assembly coarse adjustment
(Pinch lever, No. 9 guide lever, capstan motor)

Tape wrinkle at the guide rollers

Guide roller adjustment (Slider assembly)

c. Frame advance mode

Tape wrinkle at No. 8 guide

Item 3) Linearity adjustment
(Pinch lever, capstan motor)

9) Maximum AFM envelope output point check (Hi-Fi model)

1. Playback the SP mode 3 MHz video signal and the 400 Hz AFM signal on the alignment tape.
2. Trigger the oscilloscope with the video switching pulse, adjust the tracking control and check the control pulse phase at the maximum video envelope (A ch) output point.
3. Make sure the control pulse phase difference among each maximum point of AFM envelope, Ach and Bch is within ± 3 ms with the above point used as the basic reference.

Note:

- If the phase difference exceeds 3 ms, replace the upper cylinder.

2. ELECTRICAL ADJUSTMENT

<Test equipment required>

Adjustment will be performed with the following test equipment.

1. Color TV (Monitor)
2. Oscilloscope, 2 CHs, 15 MHz or higher with delay system
3. Frequency counter (7 digits or higher)
4. Millivoltmeter
5. Digital voltmenter
6. Tester (20 kΩ/V)
7. Audio generator
8. Audio attenuator
9. Alignment tapes
   Part code: ST-C6: 70909409, ST-C7: 70909410
10. Alignment screw driver (jig)
11. Color pattern generator
12. Video sweep generator

<Color bar signal>

Color bar signals of 75% recorded on the alignment tapes are shown in Fig. 2-1-1.

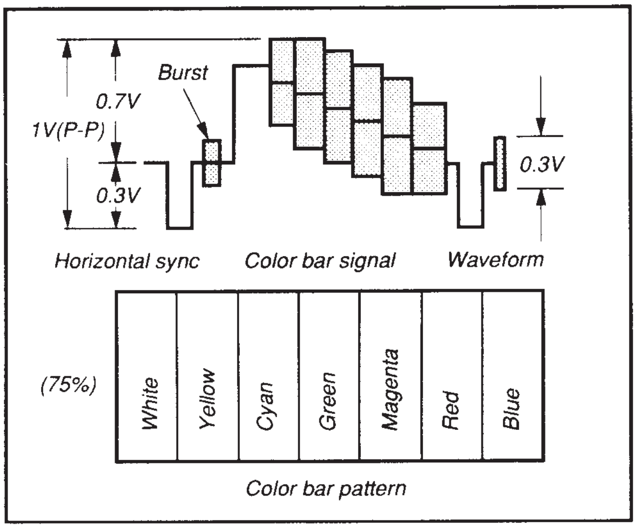

Burst
0.7V
1V(P-P)
0.3V
0.3V
Horizontal sync
Color bar signal
Waveform
(75%)
White
Yellow
Cyan
Green
Magenta
Red
Blue
Color bar pattern

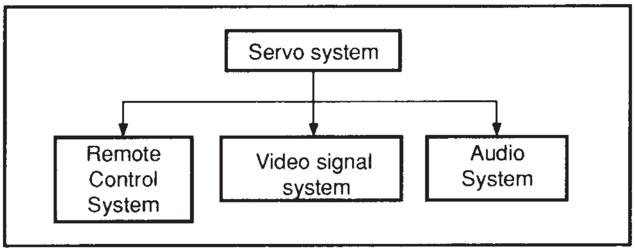
Fig. 2-1-1

<Specified input and output levels, and impedance>

Video input:	Negative sync, standard composite video siganl 1 V(p-p), 75Ω
Video output:	Same as the video input 1 V(p-p), 75Ω
Audio input:	308 mV(rms), more than 47 kΩ (phono type), more than 10 kΩ (21 pin type)
Audio output:	308 mV(rms), less than 1.0 kΩ (21 pin type)

<Alignment sequence>

Recorded the alignments in the sequence as shown in Fig. 2-1-2.


Servo system
Remote Control System
Video signal system
Audio System

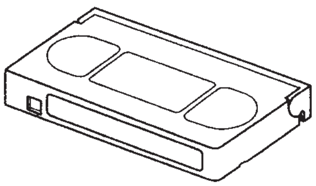


Fig. 2-1-2

Alignment tape specifications

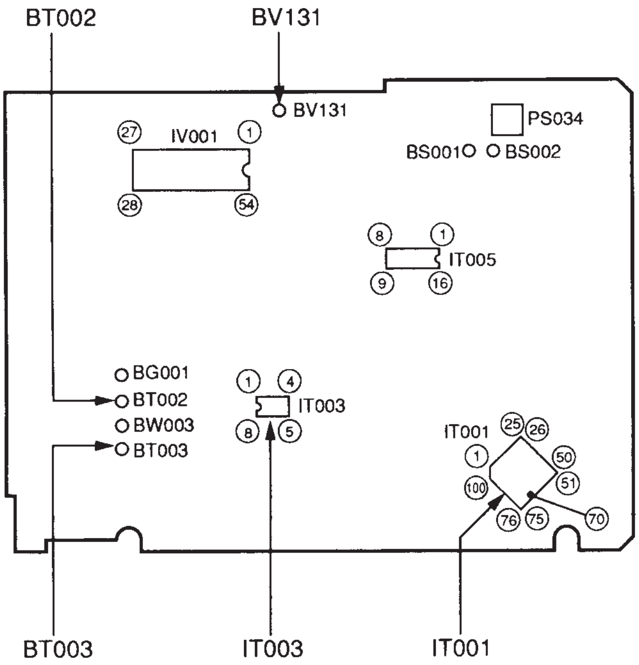
[1] ST-C6

Segment	System	Playback		Video Signal	Audio Signal	Applications
		Time (min)	Mode			
1	PAL & SECAM	10	SP	Mono Scope	1 kHz	Playback phase check, audio level check
2	PAL & SECAM	5	SP	3 MHz A ch	400 Hz and 7 kHz	ACE head position adjustment, ACE head azimuth adjustment, Linearity adjustment
3	PAL & SECAM	5	SP	3 MHz A ch	1 kHz (stereo)	ACE head position adjustment, ACE head height adjustment, Linearity adjustment
4	PAL	5	SP	Color bar	3 kHz	Video and Sound checks
5	SECAM	5	SP	Color bar	3 kHz	Video and Sound checks
6	MESECAM	5	SP	Color bar	3 kHz	Video and Sound checks
7	NTSC	5	SP	Color bar	1 kHz	Video and Sound checks

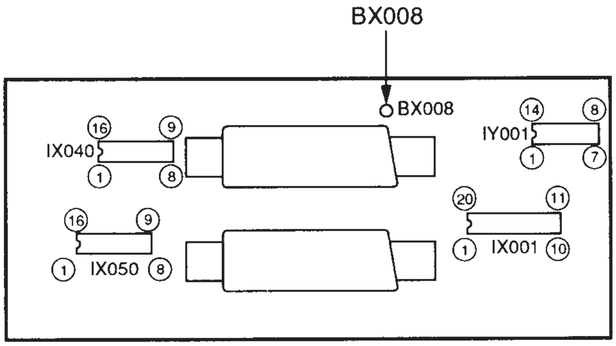
[2] ST-C7

Segment	System	Playback		Video Signal	Audio Signal	Applications
		Time (min)	Mode			
1	PAL	5	LP	3 MHz A ch	500 Hz (stereo)	ACE head position adjustment, ACE head height adjustment, Linearity adjustment
2	PAL	3	LP	Color bar	3.2 kHz	LP mode operation check, ACE head azimuth check and adjustment
3	PAL	3	SP	Color bar	AFM 400 Hz	SP mode operation check, AFM check
4	PAL & SECAM	5	SP	3 MHz A ch	AFM 400 Hz	AFM tracking checks
5	SECAM	5	LP	3 MHz A ch	No signal	Linearity adjustment
6	SECAM	3	LP	Color bar	No signal	LP mode operation check
7	SECAM	3	SP	Color bar	AFM 400 Hz	SP mode operation check, AFM check

2-1. Servo Circuit


BT002
BV131
BV131
㉗
IV001
①
㉘
(54)
PS034
BS001
BS002
⑧
①
IT005
⑨
⑯
BG001
BT002
BW003
BT003
①
④
IT003
⑧
⑤
IT001
㉕
㉖
①
(50)
(100)
(51)
(76)
(75)
(70)
BT003
IT003
IT001

Main PC Board


BX008
BX008
⑯
⑨
IX040
①
⑧
⑭
⑧
IY001
①
⑦
⑯
⑨
①
IX050
⑧
⑳
⑪
①
IX001
⑩

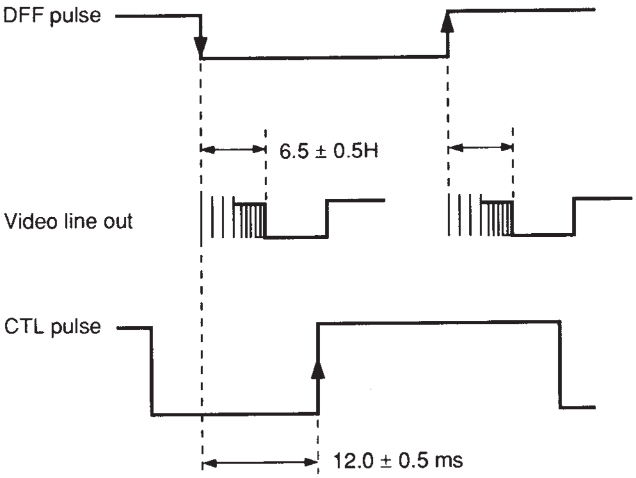
Terminal PC Board

2-1-1. Playback Phase (PG) Adjustment

Test point: BT002, BT003, BX008 (Video out)

Test equipment: Oscilloscope

1. Confirm that phase difference between the fall of the DFF pulse (BT002) and the rise of CTL pulse (BT003) is 12.0 ± 0.5 ms.
2. Further, observe the envelope (BV131) waveform, and confirm that the ACE head position adjustment and linearity adjustment have been made, and C-SYNC (pin 70 of IT001) is being input during playback.
3. Set the VTR to the STOP mode.

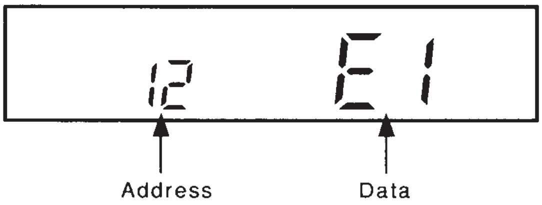

DFF pulse
6.5 ± 0.5H
Video line out
CTL pulse
12.0 ± 0.5 ms

4. Press the unit's channel up/down buttons simultaneouly for more than 5s.
5. Afterwards, within 2s, press the PLAY button on the remote controller.
6. The automatic adjustment will be made for about 10s, all the displays will blink. If the automatic adjustment is not carried out, confirm that the alignment tape has a safety tab or not, and redo from the step 3.
   1) When adjustment has been completed:
      The display will blink for 10s, stop blinking and return to the normal display in the STILL mode, then it shifts to the playback display in the playback mode.
   2) When adjustment fails:
      It goes into the STOP mode.
7. Confirm that the play indicator is displayed, and confirm that the rising and falling edge of the SW pulse is 6.5 ± 0.5H from the V-sync front edge of the video signal.

2-1-2. In Case of IT003 is Replaced

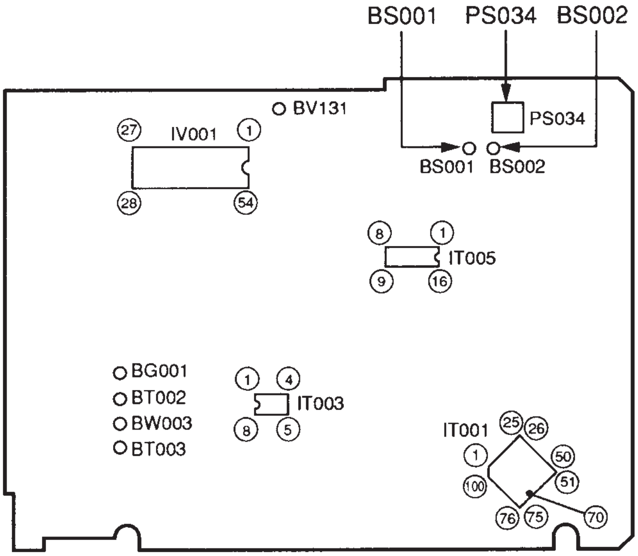
When IT003 is replaced, the data in the VTR is required to memorize in the new one. So perform the following procedures.

1. Press the channel up/down buttons on the VTR simultaneously for more than 5s while the display blinks and the unit is in the power off mode.
2. And then within 2s, press the CANCEL button on the remote controller.
3. After displaying the address at the channel display area and the data at the minute display area, set the address to 12 using the channel up/down buttons on the remote controller.
   Next, set the data to E1 using the FF/REW buttons on the remote controller. The data goes up using FF button and down using REW button.
4. Perform the adjustement described in the item "2-1-1. Playback Phase (PG) Adjustment".
5. Pull out the power cord plug from the AC outlet once and insert the power cord plug into the AC outlet again.


12
E1
Address
Data

6. Perform the channel presetting as the IT003 replaced has no channel data.

2-2. Audio Circuit


BS001
PS034
BS002
BV131
PS034
IV001
27
1
28
54
BS001
BS002
8
1
IT005
9
16
BG001
BT002
BW003
BT003
1
4
IT003
8
5
IT001
25
26
1
50
100
51
76
75
70

Main PC Board

2-2-1. Bias Level Adjustment

Test Point: BS001, BS002

Test equipment: Millivoltmeter

Adjusting point: PS034

1. Set the VTR to record mode.
2. Connect BS001 to the millivoltmeter and BS002 to GND.
3. Adjust PS034 to obtain 3.6 ± 0.1 mV(rms).

2-3. Self Diagnosis Function

2-3-1. Outline

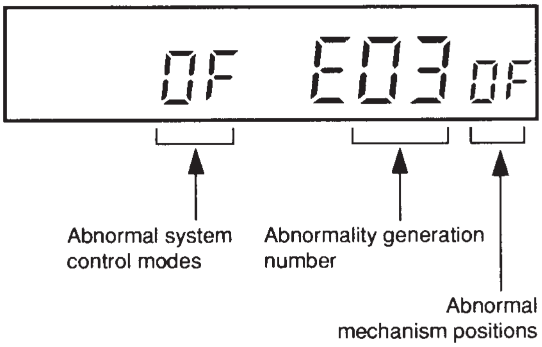
When a tape running stops or the VTR enters the power OFF mode, etc. due to some abnormality, the abnormality is stored in the EEPROM and displayed on the display tube.

2-3-2. Storing abnormal modes

- The abnormality is classed into 5 groups, and the abnormality number, system control mode, and the mechanism position at which the abnormality occurred are stored in the EEPROM.
- The writing timing is just after the abnormality occurred.

2-3-3. Abnormality mode display

- Press the CH UP and CH DOWN buttons on the VTR simultaneously for more than 5s.
- And then within 2s, press the STILL button on the remote control.
- The system control mode at which the abnormality occurred is displayed at the channel display area, "E" is displayed at the hour digit, abnormality generation number is displayed at the minute digit, and the mechanism position is displayed in the second digit position.
- The abnormality mode is displayed regardless of the power on off.


0F E03 0F
Abnormal system control modes
Abnormality generation number
Abnormal mechanism positions

- When the Counter Reset button is pressed in the display period, the abnormality display data is initialized and "-" is displayed.

The data displayed are as follows:

Abnormality generation number

01	Cylinder stop
02	Reel abnormality (take up)
03	Reel abnormality (supply)
04	Abnormal slot in/ slot out
05	Abnormal loading

Abnormal system control modes

00	Standby
01	Stop
02	Rewind
03	Review
04	FF
05	Cue
06	Playback
07	Still, slow playback
08	2X speed
09	Unloading Stop
0A	Reverse playback
0b	Still in reverse playback, Reverse slow playback
0C	Recording
0d	Record pause
0E	Power off eject
0F	Eject
10	Short FF
11	Short REW
13	Audio dubbing
14	Audio dubbing pause

Abnormal mechanism positions

01	F/L out
03	F/L down
05	Loading/unloading
07	Reverse rotation with pinch roller ON
09	Playback with pinch roller ON
0b	Stop with main brake ON
0d	FF/REW
0F	Position detection impossible

Positions 0, 2, 4 exist as mechanism positions. For example, 8 shows a position between 7 and 9 (between playback position and review position).

SECTION 3
SERVICING DIAGRAMS

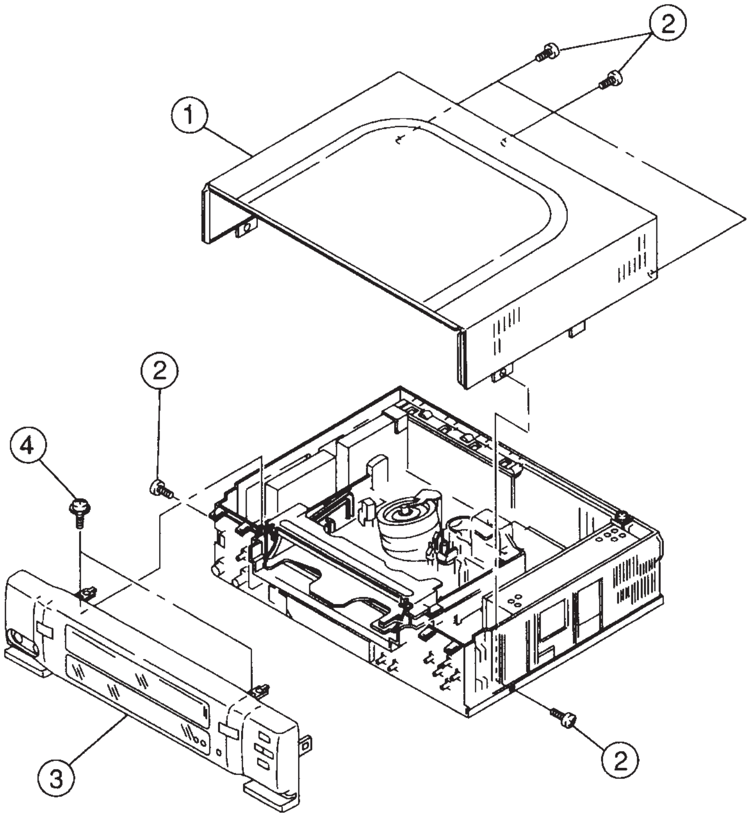
1. INSPECTION PROCEDURE

Operation steps		Items to be confirmed	Inspection block	Page	
				Block Diagram	Circuit Diagram
1. AC Plug-in	Time setting Program timer setting	Clock display Time setting operation	Power (AC system) KDB	3-11 3-13	3-28 3-33
2. Power SW ON	Timer/counter, Memory Channel selection, EE picture & tone quality	Mode display lamp TV receive condition, Channel select operation, EE picture quality, Tone signal level	Power Logic RF reception Audio (EE, REC mode)	3-11 3-17 3-12 3-26	3-28 3-36 3-31 3-47
3. Cassette-in and Cassette-out	Cassette-in Cassette loading Eject Casette-out	F/L mechanism operation Cassette loading operation Eject operation Indicator lamp Abnormal sound	Logic	3-17	3-36
4. Key Entry Operation Remote Control	REC, PLAY Cue/Review Still, Frame advance/slow FF/REW	Indicator lamp Each mode operation (Tape drive operation) Abnormal sound	Logic	3-17	3-36
5. Special Functions Counter Functions	Linear time counter, Remaining time display, Index/skip search, Time search	Each mode operation	Servo/Logic	3-17	3-36
Tracking	Digital auto tracking	Mode operation	Servo/Logic	3-17	3-36
6. Playback Function Picture Sharpness Tone Quality Othres	PLAY (Test tape: ST-C6, ST-C7) Cue/Review Still/Slow	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-23 3-26 3-17	3-40 3-47 3-36
7. REC/PLAY Functions Picture Sharpness Tone Quality Others	REC/PLAY	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-23 3-26 3-17	3-40 3-47 3-36

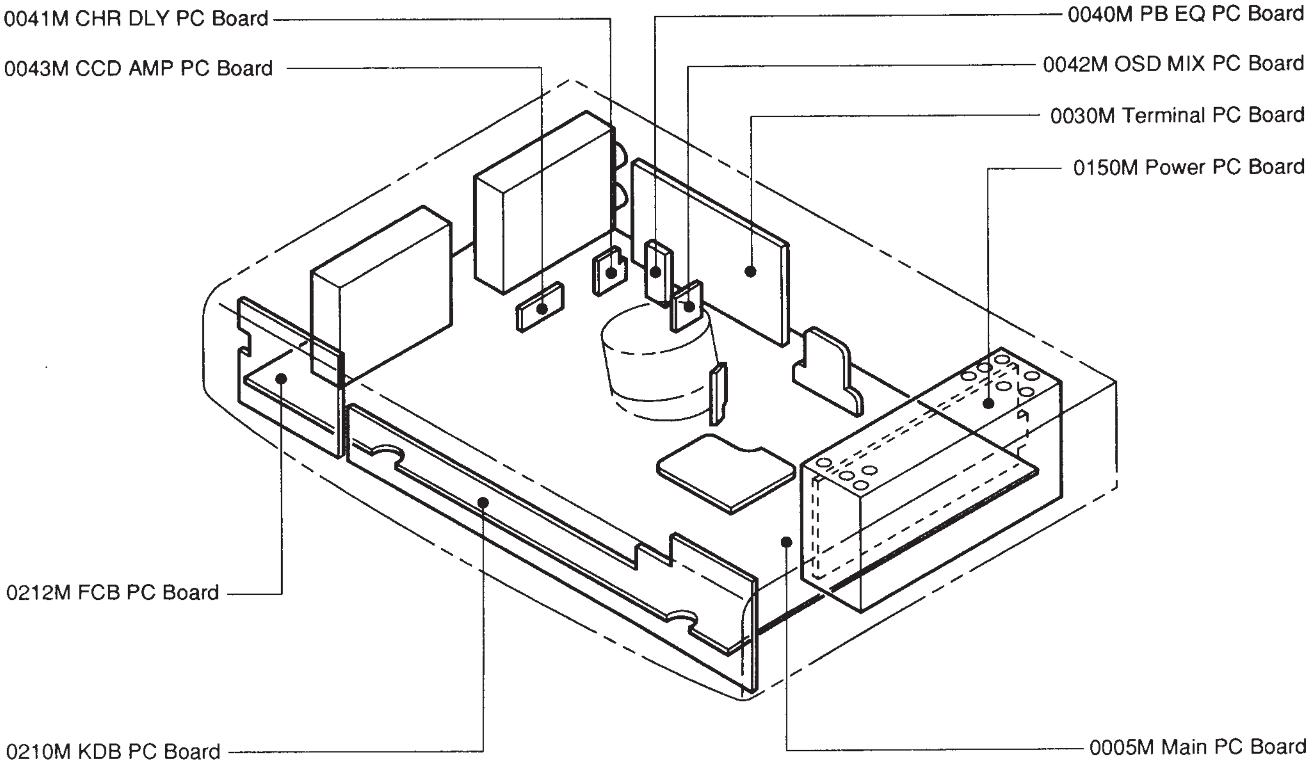
How to use the table
1. When inspecting a defective VTR, proceed according to the steps shown in the table.
2. Check the items to be confirmed for each operation step.
3. If a problem is found on the item, check waveforms (level) referring to the block diagram relating to the items.
4. Use PC board pattern diagram and schematic diagram to examine the circuit precisely.

2. REMOVAL OF CABINET

1. Disconnect power cord plug from AC outlet.
2. Remove 5 screws ② securing top cover ①.
3. Remove the top cover ① by sliding it backward.
4. Remove 2 screws ④.
5. Remove the front panel ③.



3. ELECTRICAL UNITS LOCATION DIAGRAM



0041M CHR DLY PC Board
0043M CCD AMP PC Board
0040M PB EQ PC Board
0042M OSD MIX PC Board
0030M Terminal PC Board
0150M Power PC Board
0212M FCB PC Board
0210M KDB PC Board
0005M Main PC Board

4. STANDING PC BOARDS FOR SERVICING

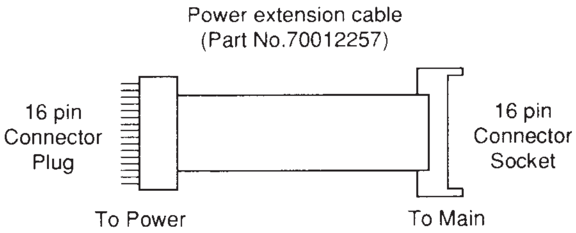
After removing the mechanical deck with the main PC board, place the mechanical deck to upright. Then perform servicing in the condition that all the units are connected each other.

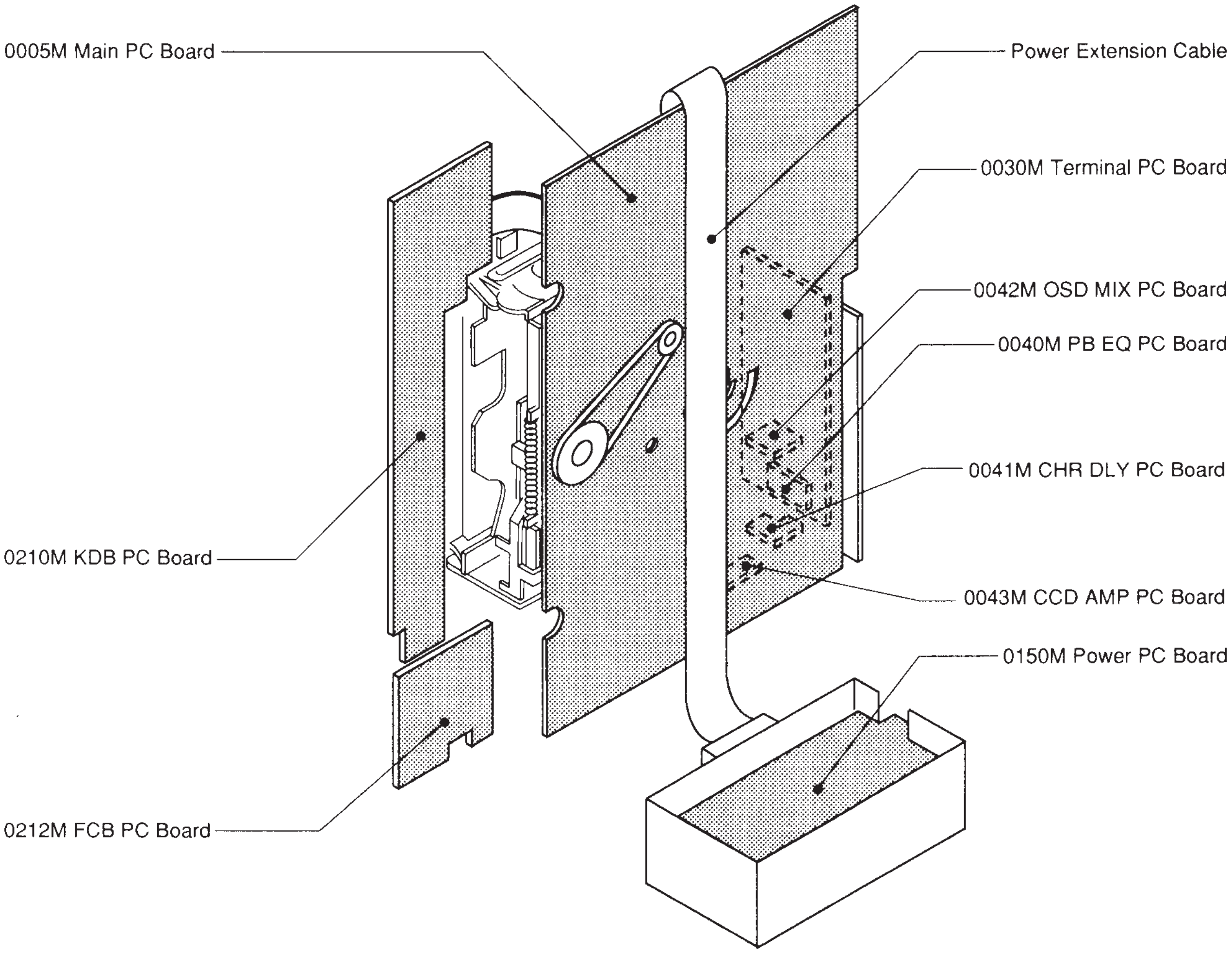
Note:

- Applying an excessive force to the connector connecting KDB and FCB PC board will damage the connector.

  So, take much care when removing them.

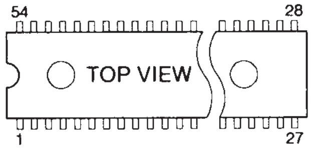
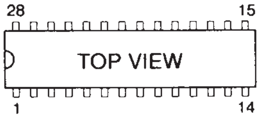
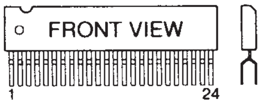
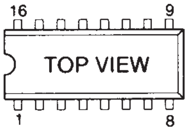
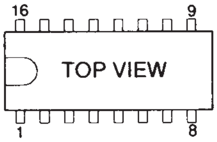
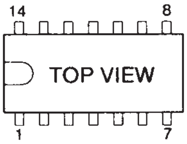
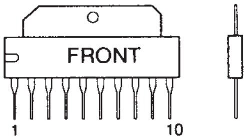
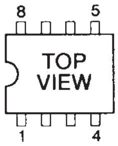
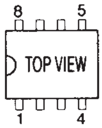
- Connect the Power PC board to the Main PC board using the power extension cable (Part No. 70012257).

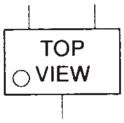
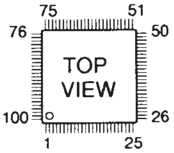
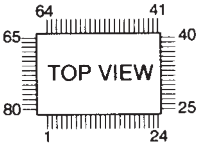

Power extension cable
(Part No.70012257)
16 pin
Connector
Plug
16 pin
Connector
Socket
To Power
To Main


0005M Main PC Board
Power Extension Cable
0030M Terminal PC Board
0042M OSD MIX PC Board
0040M PB EQ PC Board
0041M CHR DLY PC Board
0210M KDB PC Board
0043M CCD AMP PC Board
0150M Power PC Board
0212M FCB PC Board

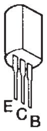
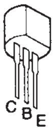
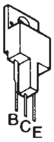
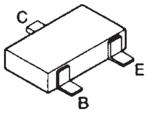
5. PART CONFIGURATION AND THEIR SYMBOLS

1.ICs

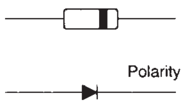
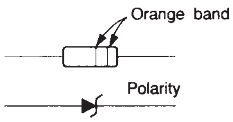
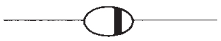
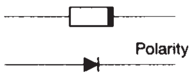
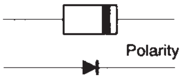
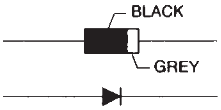
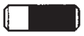
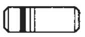
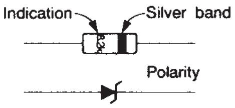
NAME	SHAPE
TA8892N	 54 28 TOP VIEW 1 27
STV6400	 28 15 TOP VIEW 1 14
BA7795LS	 FRONT VIEW 1 24
TL8843P TB6515AP MC14053BCP	 16 9 TOP VIEW 1 8
MC14052/BCP	 16 9 TOP VIEW 1 8
U4614B	 14 8 TOP VIEW 1 7
TA7291S	
TL8844P	 8 5 TOP VIEW 1 4
ST24C02AB1 LM393N	 8 5 TOP VIEW 1 4

NAME	SHAPE
PST7032MT	
TMP90CR74DF-7481	 75 51 76 50 TOP VIEW 100 26 1 25
TMP87CK70AF-6299	 64 41 65 40 TOP VIEW 80 25 1 24

2.TRANSISTORs

2SC2236-Y(C) 2SA1020-Y	
BC337 BC548B	
BUL310XI	
RN1402,BC848A DTC144E,BC848 RN2403,BC857B RN1405,BC847B RN1404,BC848B BC858	

3.DIODEs

NAME	SHAPE
1N4007 1N4148 1N4148	
ZPD5.6	 Orange band Polarity
MUR115	
1N4001	
BAV20	
1N5822 BA157 BA157	
LL4448	
ZMM5.1 ZMM5.6	
ZPD12	 Indication Silver band Polarity

NAME	SHAPE

5-1. Replacing Subminiature "CHIP" Parts

5-1-1. Required Tools:

1. Fine tipped, well insulated soldering "pencil", about 30 Watts.
2. Tweezers.
3. Blower type hair dryer.

5-1-2. Soldering Cautions:

1. Do not apply heat for more than 3s.
2. Avoid using a rubbing stroke when soldering.
3. Discard removed chips; do no reuse them.
4. Supplementary cementing is not required.
5. Use care not to scratch or otherwise damage the chips.

5-1-3. Removal (Resistors, Capacitors, etc.):

1. Melt the solder at one side.

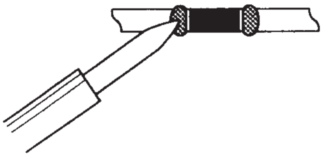


Fig. 1

2. Grasp the part with tweezers and melt the solder at the other side.

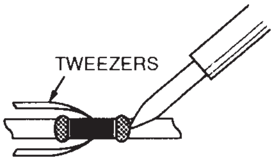


Fig. 2

3. Remove the part with a twisting motion.

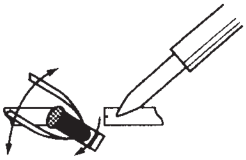


Fig. 3

5-1-4. Removal (Transistors, Diodes, etc.):

1. Melt the solder of one lead.

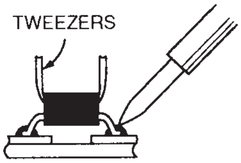


Fig. 4

2. Lift the side of that lead upward.

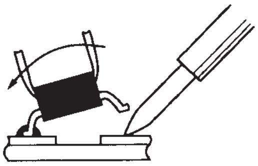


Fig. 5

3. Simultaneously heat solder the two remaining leads and lift part to remove.

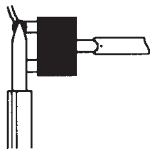


Fig. 6

5-1-5. Preheating (Except for semiconductors):

Immediately before installing new resistors or capacitors, use a blower type hair dryer and preheat the part for about two min. at approximately 150°C.

5-1-6. Replacement:

1. Presolder the contact points of the circuit pattern.

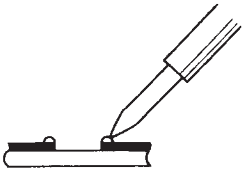


Fig. 7

2. Press the part downward with tweezers and apply the soldering pencil as indicated in the figure.

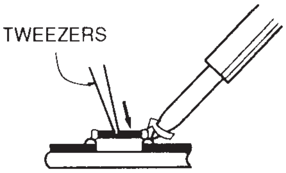


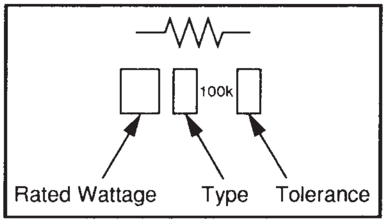
Fig. 8

5-2. Precautions for Part Replacement

- In the schematic diagram, parts marked ⚠ (ex. ⚠ F801) are critical part to meet the safety regulations, so always use the parts bearing specified part codes (SN) when replacing them.
- Using the parts other than those specified shall violate the regulations, and may cause troubles such as operation failures, fire etc.

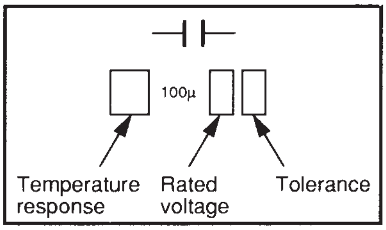
5-3. Solid Resistor Indication

Unit	None .... Ω k .... kΩ M .... MΩ
Tolerance	None .... ±5% B .... ±0.1% C .... ±0.25% D .... ±0.5% E .... ±1% G .... ±2% K .... ±10% M .... ±20%
Rated Wattage	(1) Chip Parts None .... 1/16W (2) Other Parts None .... 1/6W Other than above, described in the Circuit Diagram.
Type	None .... Carbon film S .... Solid R .... Oxide metal film W .... Metal film W .... Cement FR .... Fusible



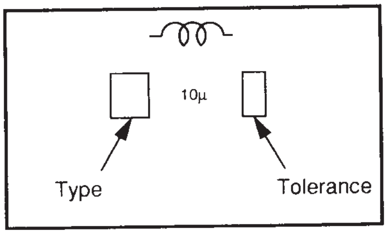
5-4. Capacitance Indication

Symbol	⊣⊢ + ... Electrolytic, Special electrolytic ⊣⊢ NP .... Non polarity electrolytic ⊣⊢ .... Ceramic, plastic ⊣⊢ M .... Film ⊣⊬ .... Trimmer
Unit	None .... F µ .... µF p .... pF
Rated voltage	None .... 50V For other than 50V and electrolytic capacitors, described in the Circuit Diagram.
Tolerance	(1) Ceramic, plastic, and film capacitors of which capacitance are more than 10 pF. None .... ±5% or more B .... ±0.1% C .... ±0.25% D .... ±0.5% F .... ±1% G .... ±2% (2) Ceramic, plastic, and film capacitors of which capacitance are 10 pF or less. None .... more than ±5% pF B .... ±0.1 pF C .... ±0.25 pF (3) Electrolytic, Trimmer Tolerance is not described.
Temperature characteristic (Ceramic capacitor)	None .... SL For others, temperature characteristics are described. (For capacitors of 0.01 µF and no indications are described as F.)



5-5. Inductor Indication

Unit	None	.... H
	μ	.... μH
	m	.... mH
Tolerance	None	.... ±5%
	B	.... ±0.1%
	C	.... ±0.25%
	D	.... ±0.5%
	F	.... ±1%
	G	.... ±2%
	K	.... ±10%
	M	.... ±20%
Type	PL	.... Peaking
	For other, model name is described.	



5-6. Waveform and Voltage Measurement

- Measurement of waveform and voltage at each section in the color circuits was conducted with sufficient service color bar signal being received and reproduced in normal conditions.
- Waveforms and voltage values for the remaining circuit were measured with a broadcasting signal normally received, so they may vary slightly according to the programs being received. Use them as a measure for servicing.
- All voltage values except the waveforms are expressed in DC and measured by a digital voltmeter.

5-7. Chip Part Replacement

(Use spare part with wire leads connected.)

1. Hold a Chip part to be removed with tweezers and apply heat to the solder at one end of the part with a soldering iron. (Fig. 9)

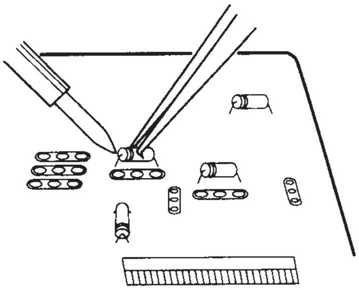


Fig. 9

2. Apply heat to the solder at the other end of the part and remove it.

   The heating time should be as short as possible so the excessive heat is not applied to foil patterns and the PC Board.

3. If it is difficult to remove the part, temporarily stop the desoldering job and wait until temperature of the part lowers.

   Then, repeat steps 1 and 2.

4. Form leads of the replacement part (general part equivalent to the chip part) as shown in the figures and solder place. (Fig. 10)

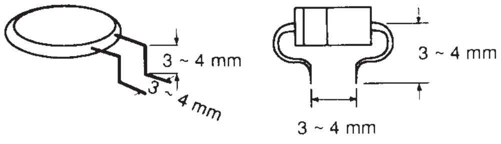


Fig. 10

5. Mount the replacement part so that it does not touch any other parts. (Fig. 11)

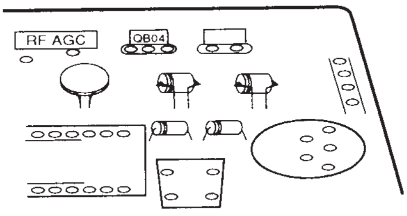
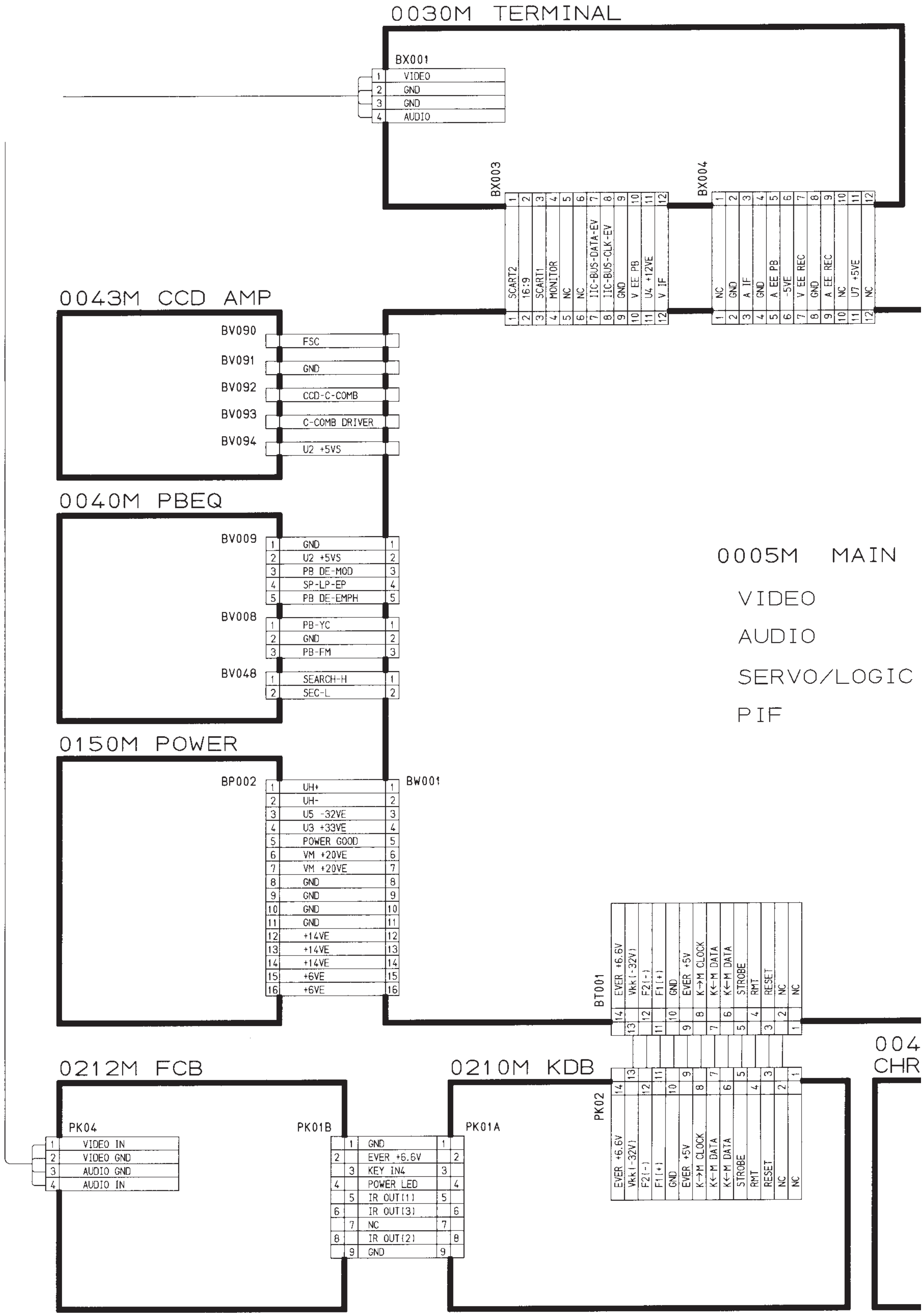
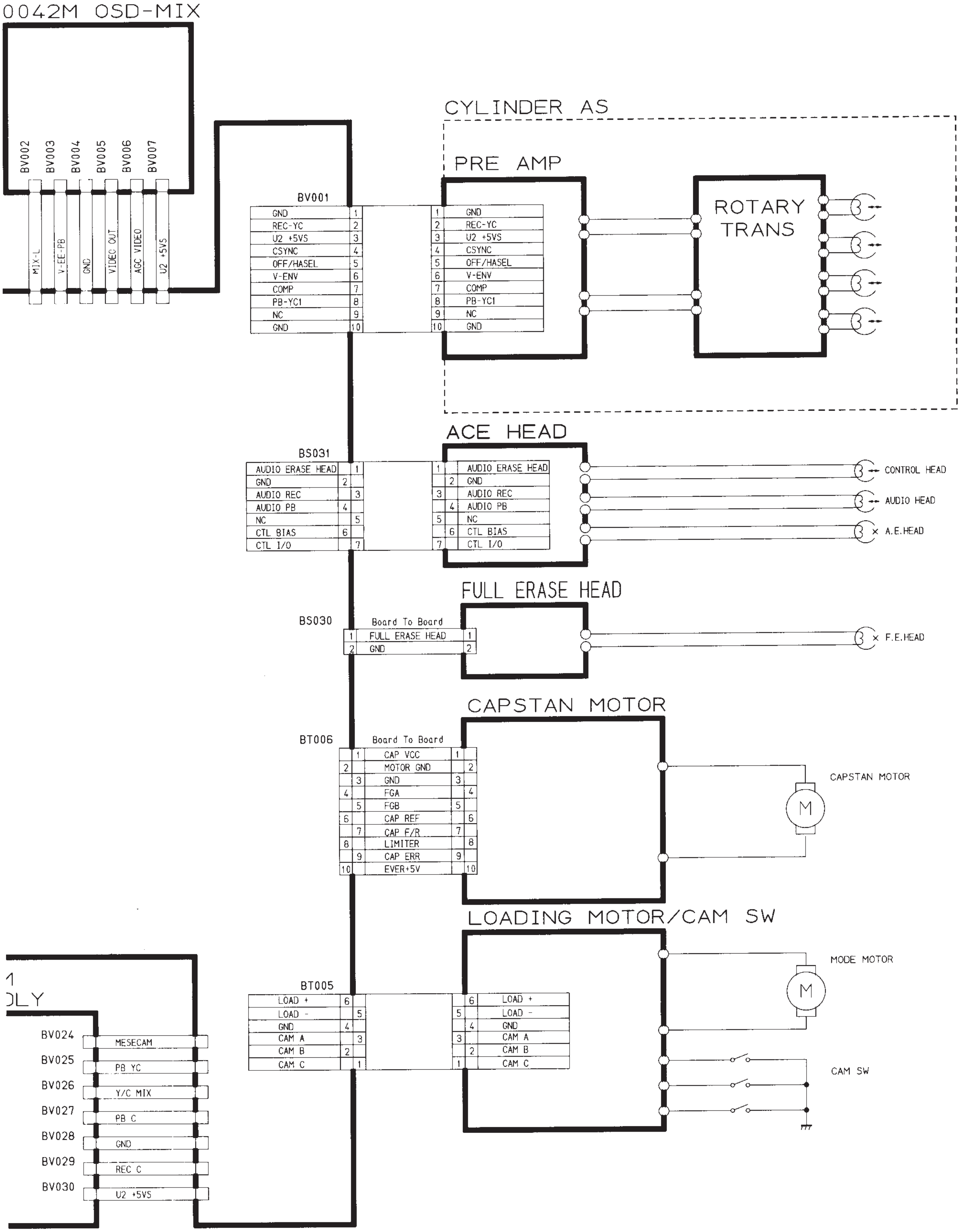


Fig. 11

6. PRINTED WIRING AND SCHEMATIC DIAGRAM



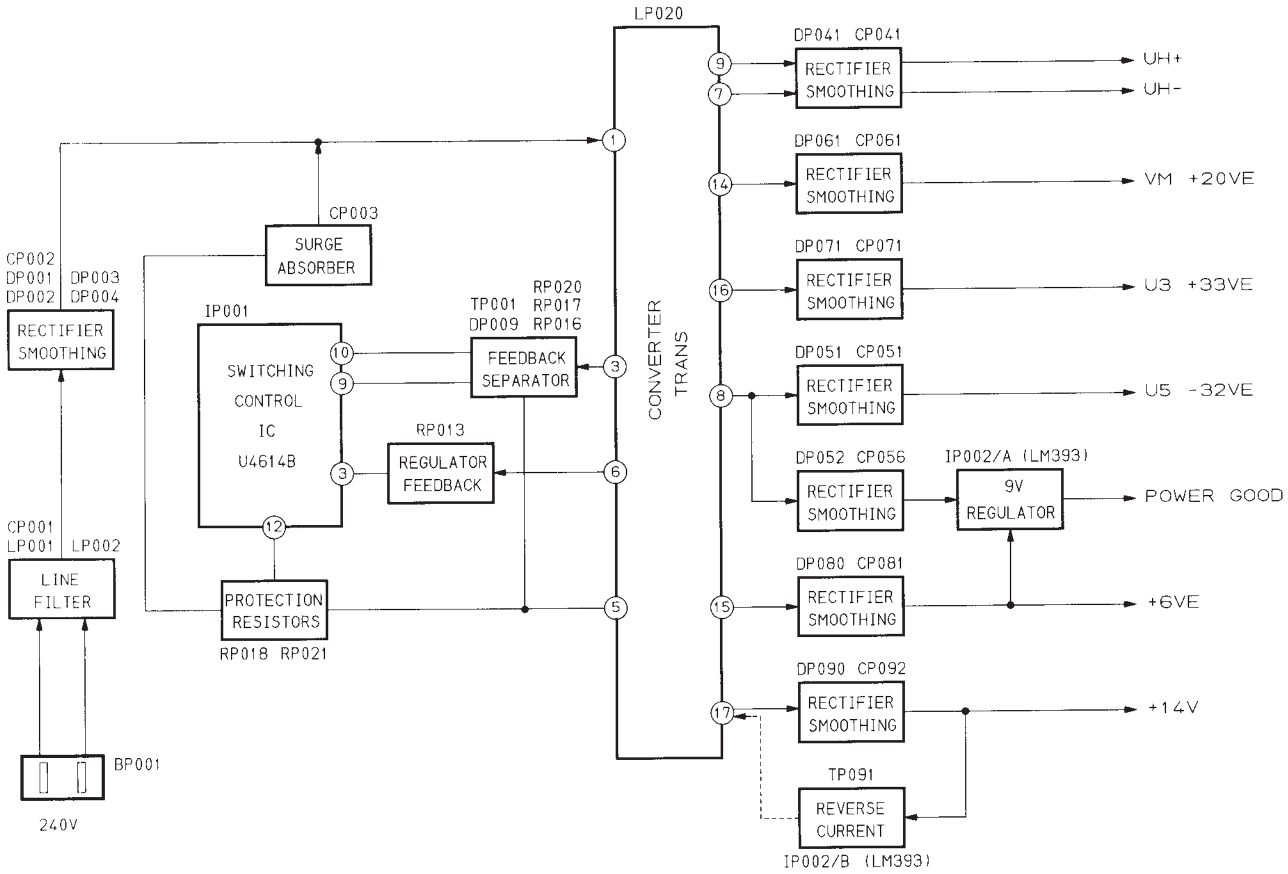
0030M TERMINAL
BX001
1 VIDEO
2 GND
3 GND
4 AUDIO
BX003
1 SCART2
2 16:9
3 SCART1
4 MONITOR
5 NC
6 NC
7 IIC-BUS-DATA-EV
8 IIC-BUS-CLK-EV
9 GND
10 V EE PB
11 U4 +12VE
12 V IF
BX004
1 NC
2 GND
3 A IF
4 GND
5 A EE PB
6 -5VE
7 V EE REC
8 GND
9 A EE REC
10 NC
11 U7 +5VE
12 NC
0043M CCD AMP
BV090 FSC
BV091 GND
BV092 CCD-C-COMB
BV093 C-COMB DRIVER
BV094 U2 +5VS
0040M PBEQ
BV009
1 GND
2 U2 +5VS
3 PB DE-MOD
4 SP-LP-EP
5 PB DE-EMPH
BV008
1 PB-YC
2 GND
3 PB-FM
BV048
1 SEARCH-H
2 SEC-L
0005M MAIN
VIDEO
AUDIO
SERVO/LOGIC
PIF
0150M POWER
BP002
BW001
1 UH+
2 UH-
3 U5 -32VE
4 U3 +33VE
5 POWER GOOD
6 VM +20VE
7 VM +20VE
8 GND
9 GND
10 GND
11 GND
12 +14VE
13 +14VE
14 +14VE
15 +6VE
16 +6VE
BT001
14 EVER +6.6V
13 Vkk(-32V)
12 F2(-)
11 F1(+)
10 GND
9 EVER +5V
8 K→M CLOCK
7 K←M DATA
6 K←M DATA
5 STROBE
4 RMT
3 RESET
2 NC
1 NC
0212M FCB
PK04
1 VIDEO IN
2 VIDEO GND
3 AUDIO GND
4 AUDIO IN
PK01B
0210M KDB
PK01A
1 GND
2 EVER +6.6V
3 KEY IN4
4 POWER LED
5 IR OUT(1)
6 IR OUT(3)
7 NC
8 IR OUT(2)
9 GND
PK02
14 EVER +6.6V
13 Vkk(-32V)
12 F2(-)
11 F1(+)
10 GND
9 EVER +5V
8 K→M CLOCK
7 K←M DATA
6 K←M DATA
5 STROBE
4 RMT
3 RESET
2 NC
1 NC
004
CHR



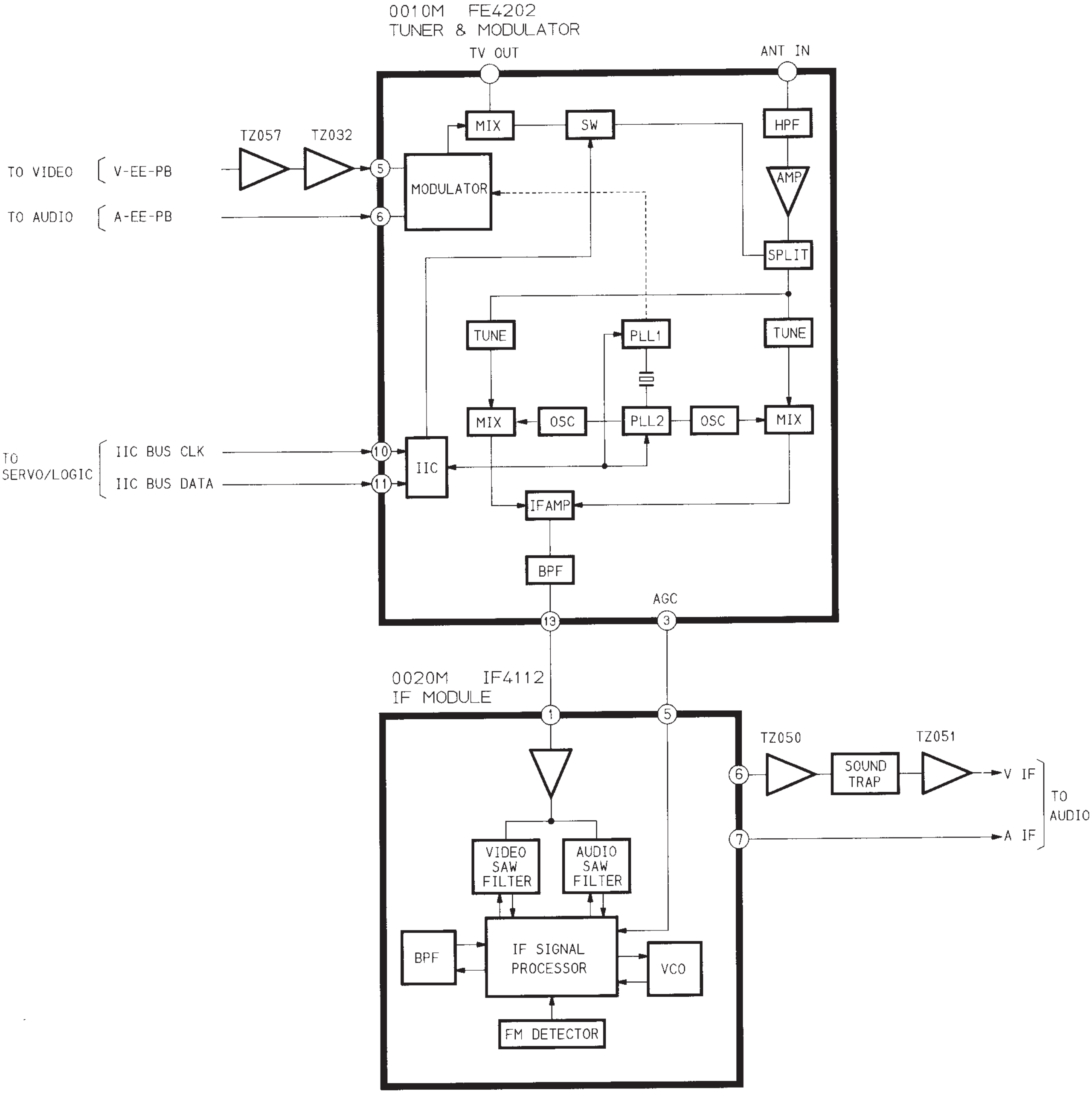
0042M OSD-MIX
BV002
BV003
BV004
BV005
BV006
BV007
MIX-L
V-EE-PB
GND
VIDEO OUT
AGC VIDEO
U2 +5VS
BV001
GND 1
REC-YC 2
U2 +5VS 3
CSYNC 4
OFF/HASEL 5
V-ENV 6
COMP 7
PB-YC1 8
NC 9
GND 10
CYLINDER AS
PRE AMP
ROTARY TRANS
BS031
AUDIO ERASE HEAD 1
GND 2
AUDIO REC 3
AUDIO PB 4
NC 5
CTL BIAS 6
CTL I/O 7
ACE HEAD
CONTROL HEAD
AUDIO HEAD
A.E.HEAD
FULL ERASE HEAD
BS030
Board To Board
FULL ERASE HEAD 1
GND 2
F.E.HEAD
CAPSTAN MOTOR
BT006
Board To Board
CAP VCC 1
MOTOR GND 2
GND 3
FGA 4
FGB 5
CAP REF 6
CAP F/R 7
LIMITER 8
CAP ERR 9
EVER+5V 10
CAPSTAN MOTOR
M
LOADING MOTOR/CAM SW
MODE MOTOR
M
BT005
LOAD + 6
LOAD - 5
GND 4
CAM A 3
CAM B 2
CAM C 1
CAM SW
1
DLY
BV024
BV025
BV026
BV027
BV028
BV029
BV030
MESECAM
PB YC
Y/C MIX
PB C
GND
REC C
U2 +5VS

7. BLOCK DIAGRAMS

7-1. Power Block Diagram

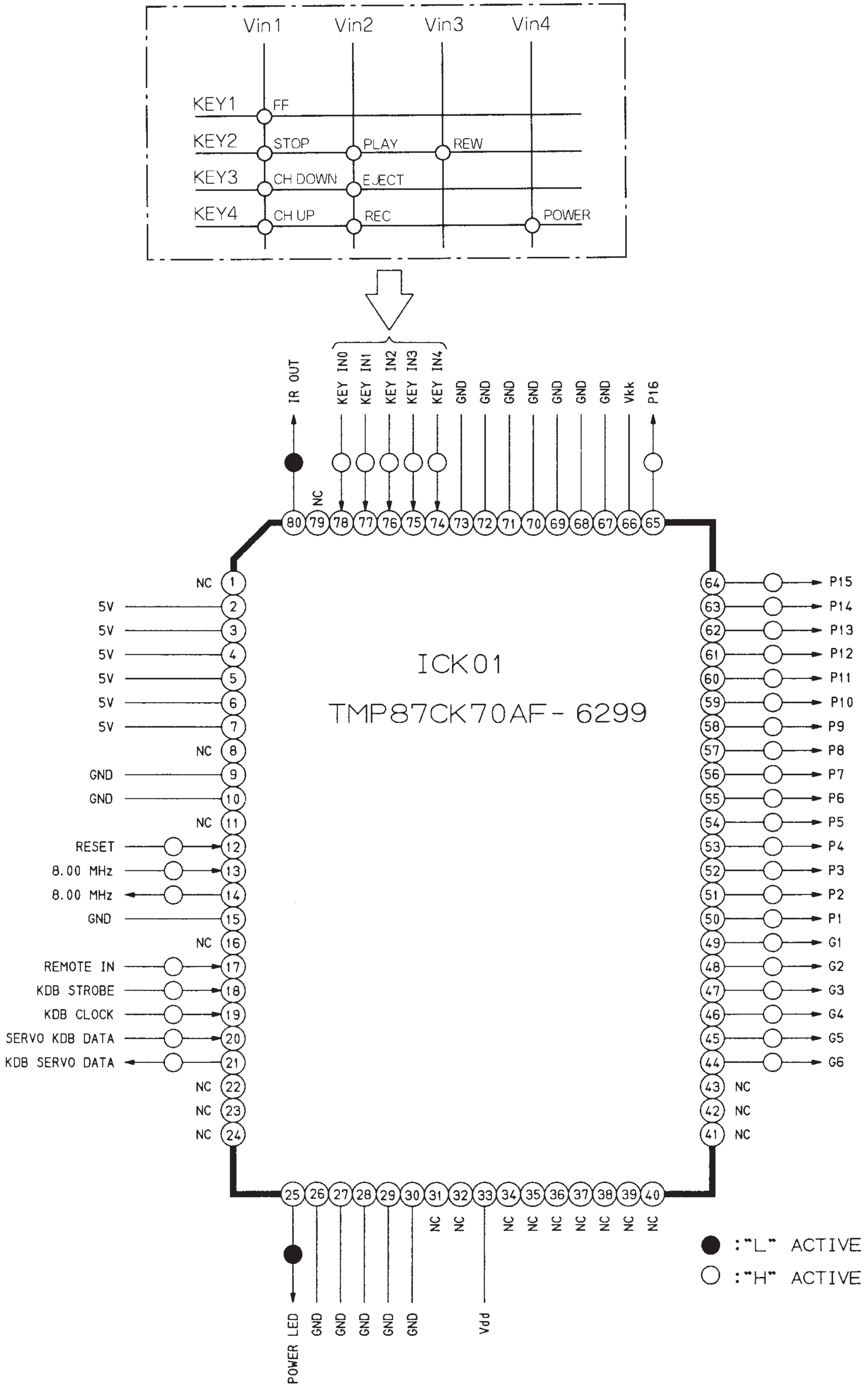

LP020
DP041 CP041
RECTIFIER SMOOTHING
UH+
UH-
DP061 CP061
RECTIFIER SMOOTHING
VM +20VE
CP003
SURGE ABSORBER
CP002
DP001 DP003
DP002 DP004
RECTIFIER SMOOTHING
DP071 CP071
RECTIFIER SMOOTHING
U3 +33VE
IP001
SWITCHING CONTROL IC U4614B
RP020
TP001 RP017
DP009 RP016
FEEDBACK SEPARATOR
CONVERTER TRANS
DP051 CP051
RECTIFIER SMOOTHING
U5 -32VE
RP013
REGULATOR FEEDBACK
DP052 CP056
RECTIFIER SMOOTHING
IP002/A (LM393)
9V REGULATOR
POWER GOOD
CP001
LP001 LP002
LINE FILTER
PROTECTION RESISTORS
RP018 RP021
DP080 CP081
RECTIFIER SMOOTHING
+6VE
DP090 CP092
RECTIFIER SMOOTHING
+14V
BP001
240V
TP091
REVERSE CURRENT
IP002/B (LM393)
1
3
5
6
7
8
9
10
12
14
15
16
17

7-2. PIF Block Diagram

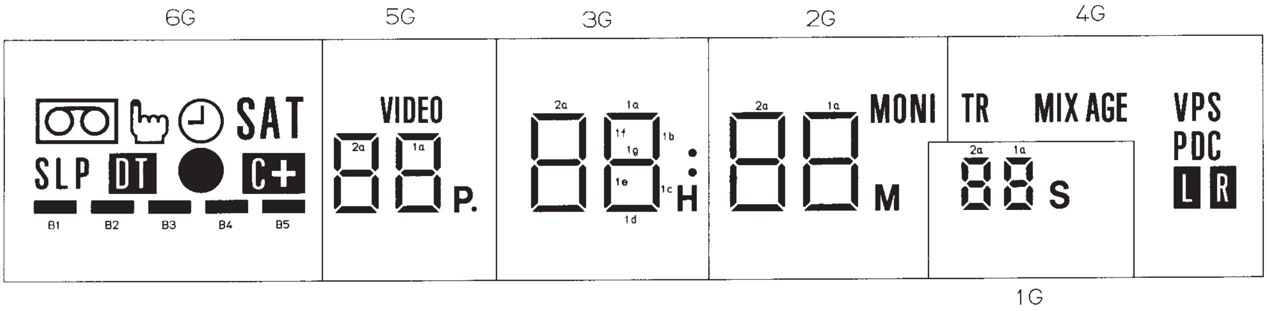

0010M FE4202
TUNER & MODULATOR
TV OUT
ANT IN
MIX
SW
HPF
AMP
TZ057
TZ032
TO VIDEO
V-EE-PB
TO AUDIO
A-EE-PB
5
6
MODULATOR
SPLIT
TUNE
PLL1
TUNE
MIX
OSC
PLL2
OSC
MIX
TO SERVO/LOGIC
IIC BUS CLK
IIC BUS DATA
10
11
IIC
IFAMP
BPF
AGC
13
3
0020M IF4112
IF MODULE
1
5
TZ050
SOUND TRAP
TZ051
6
7
V IF
A IF
TO AUDIO
VIDEO SAW FILTER
AUDIO SAW FILTER
BPF
IF SIGNAL PROCESSOR
VCO
FM DETECTOR

7-3. KDB Block Diagram

7-3-1. Timer Microcomputer Terminal Function

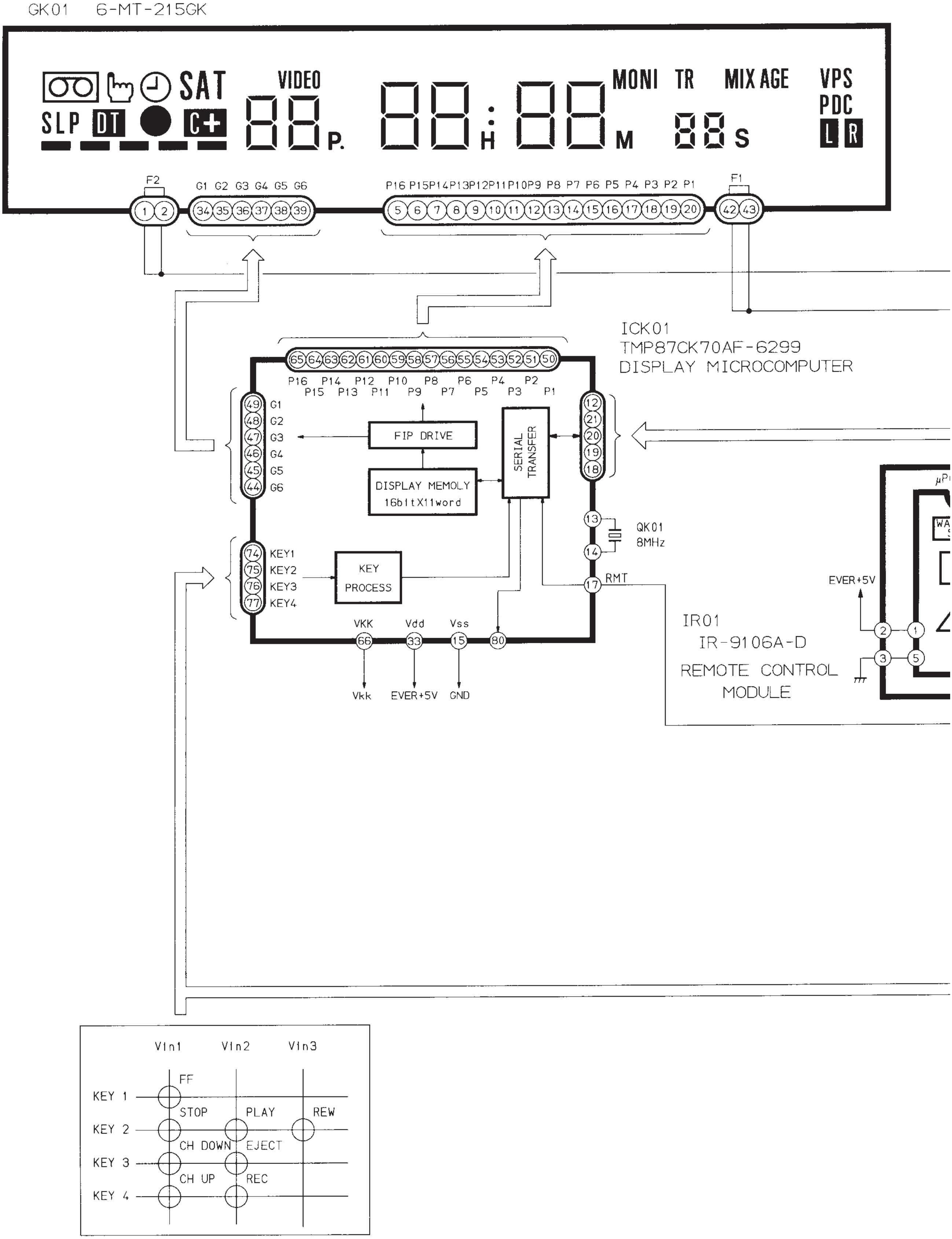

Vin1
Vin2
Vin3
Vin4
KEY1
FF
KEY2
STOP
PLAY
REW
KEY3
CH DOWN
EJECT
KEY4
CH UP
REC
POWER
IR OUT
KEY IN0
KEY IN1
KEY IN2
KEY IN3
KEY IN4
GND
GND
GND
GND
GND
GND
GND
Vkk
P16
NC
80
79
78
77
76
75
74
73
72
71
70
69
68
67
66
65
ICK01
TMP87CK70AF-6299
NC 1
5V 2
5V 3
5V 4
5V 5
5V 6
5V 7
NC 8
GND 9
GND 10
NC 11
RESET 12
8.00 MHz 13
8.00 MHz 14
GND 15
NC 16
REMOTE IN 17
KDB STROBE 18
KDB CLOCK 19
SERVO KDB DATA 20
KDB SERVO DATA 21
NC 22
NC 23
NC 24
64 P15
63 P14
62 P13
61 P12
60 P11
59 P10
58 P9
57 P8
56 P7
55 P6
54 P5
53 P4
52 P3
51 P2
50 P1
49 G1
48 G2
47 G3
46 G4
45 G5
44 G6
43 NC
42 NC
41 NC
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
NC
NC
NC
NC
NC
NC
NC
NC
NC
POWER LED
GND
GND
GND
GND
GND
Vdd
● :"L" ACTIVE
○ :"H" ACTIVE

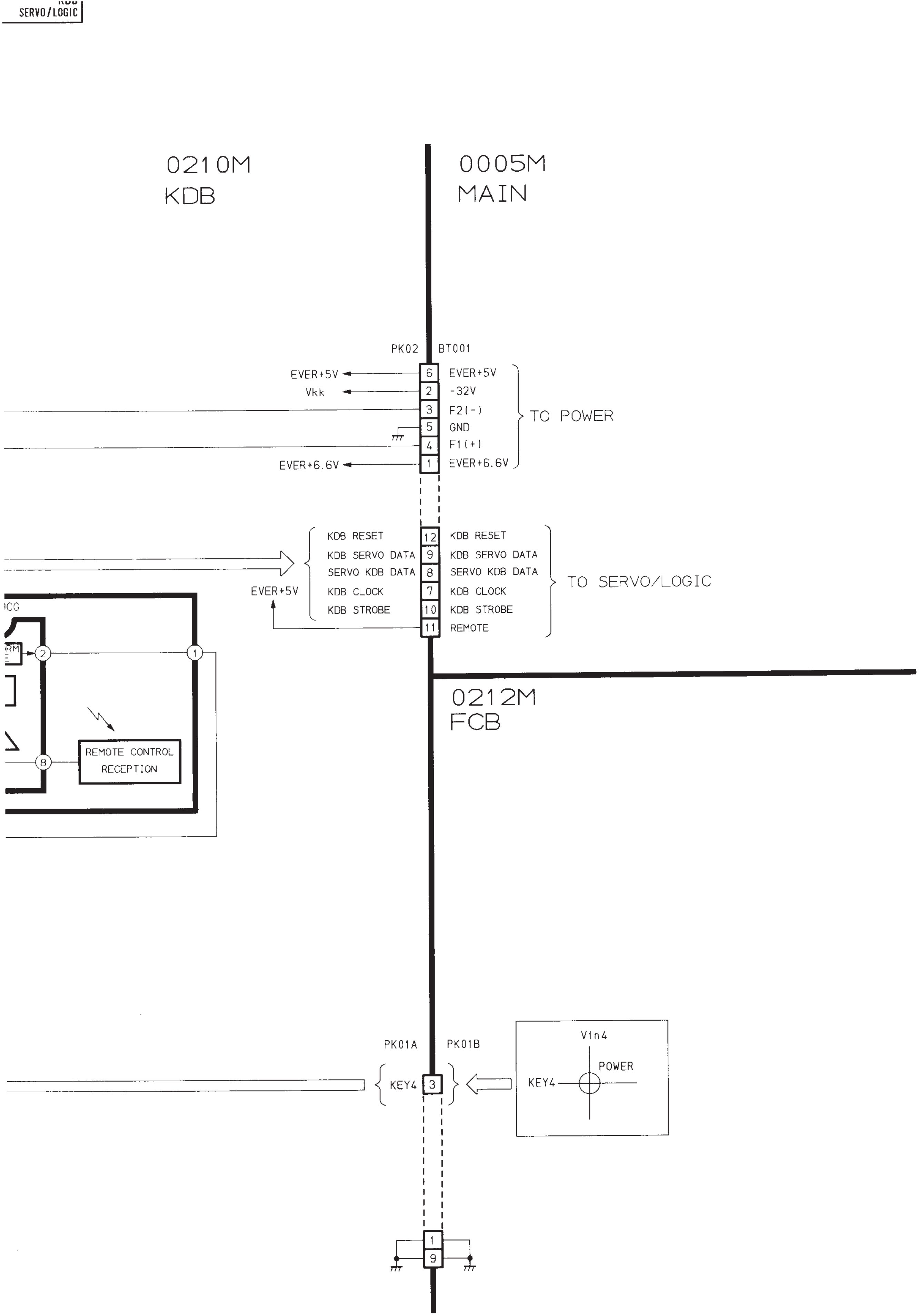
7-3-2. Key Display GX01 6-MT-215GK


6G
5G
3G
2G
4G
SAT
SLP
DT
C+
B1
B2
B3
B4
B5
VIDEO
2a
1a
P.
2a
1a
1f
1g
1b
1e
1c
1d
H
2a
1a
MONI
M
TR
MIX AGE
VPS
PDC
2a
1a
S
L
R
1G

7-3-3. Display Pattern

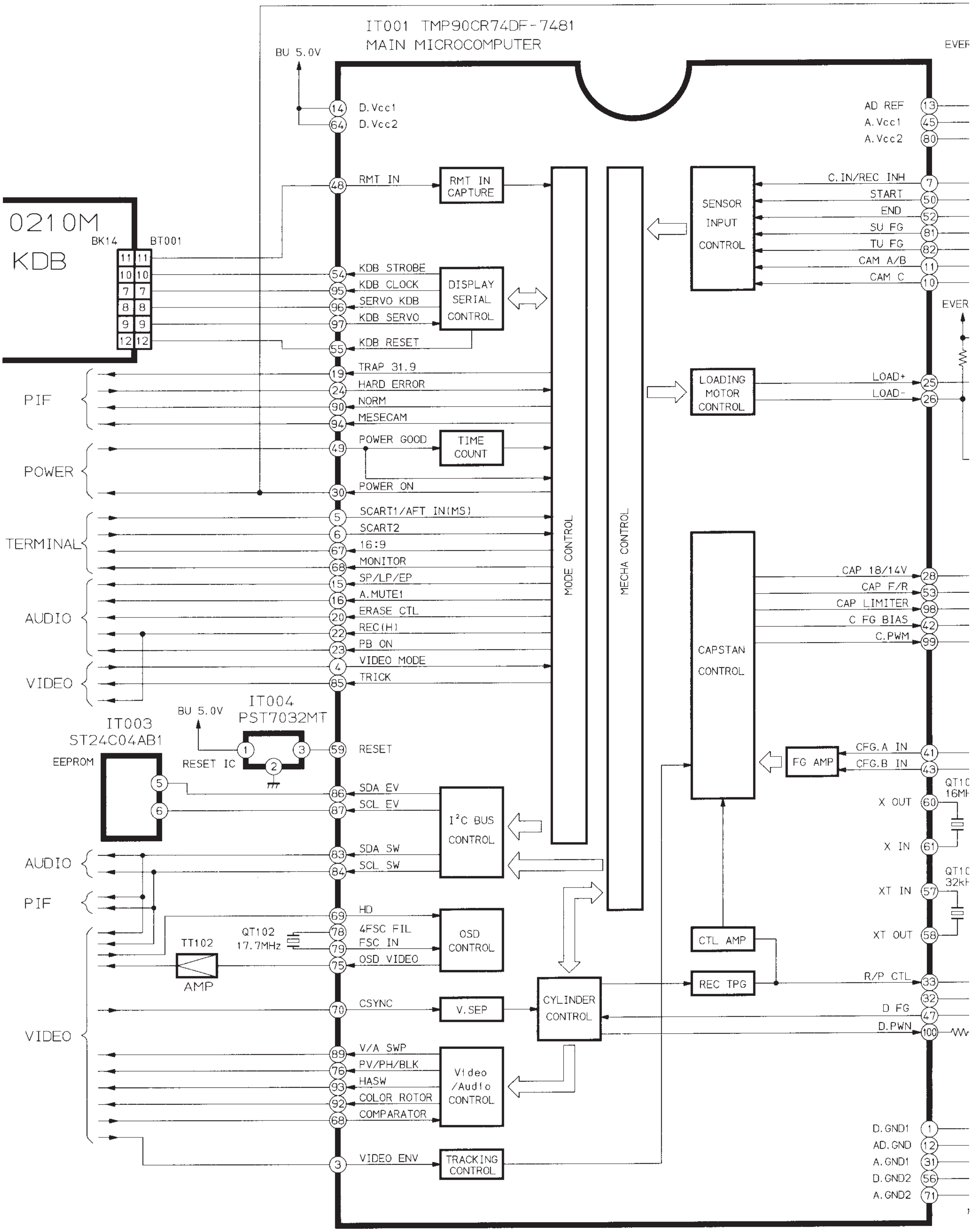
	6G	5G	4G	3G	2G	1G
P1	◷	1d	**VPS**	1d	1d	1d
P2		1e	**MIX**	1e	1e	1e
P3	☝	1c	**AGE**	1c	1c	1c
P4	●	1g	**PDC**	1g	1g	1g
P5	**P**	1f	**L**	1f	1f	1f
P6	**L**	1b		1b	1b	1b
P7	**S**	1a	**R**	1a	1a	1a
P8	📼	**VIDEO**	**TR**	**H**	**M**	**S**
P9	B5	2d		2d	2d	2d
P10	B4	2e		2e	2e	2e
P11	B3	2c		2c	2c	2c
P12	B2	2g		2g	2g	2g
P13	B1	2f		2f	2f	2f
P14	**C+**	2b		2b	2b	2b
P15	**SAT**	2a		2a	2a	2a
P16	**DT**	**P.**		col :	**MONI**	


GK01 6-MT-215GK
SAT
VIDEO
88P.
88H:88M
MONI
TR
MIX AGE
VPS
PDC
88S
L R
SLP
DT
C+
F2
F1
G1 G2 G3 G4 G5 G6
P16 P15 P14 P13 P12 P11 P10 P9 P8 P7 P6 P5 P4 P3 P2 P1
ICK01
TMP87CK70AF-6299
DISPLAY MICROCOMPUTER
FIP DRIVE
DISPLAY MEMOLY
16bitX11word
SERIAL TRANSFER
KEY PROCESS
KEY1
KEY2
KEY3
KEY4
QK01
8MHz
RMT
VKK
Vdd
Vss
Vkk
EVER+5V
GND
IR01
IR-9106A-D
REMOTE CONTROL MODULE
EVER+5V
μP
WA
Vin1
Vin2
Vin3
KEY 1
KEY 2
KEY 3
KEY 4
FF
STOP
PLAY
REW
CH DOWN
EJECT
CH UP
REC

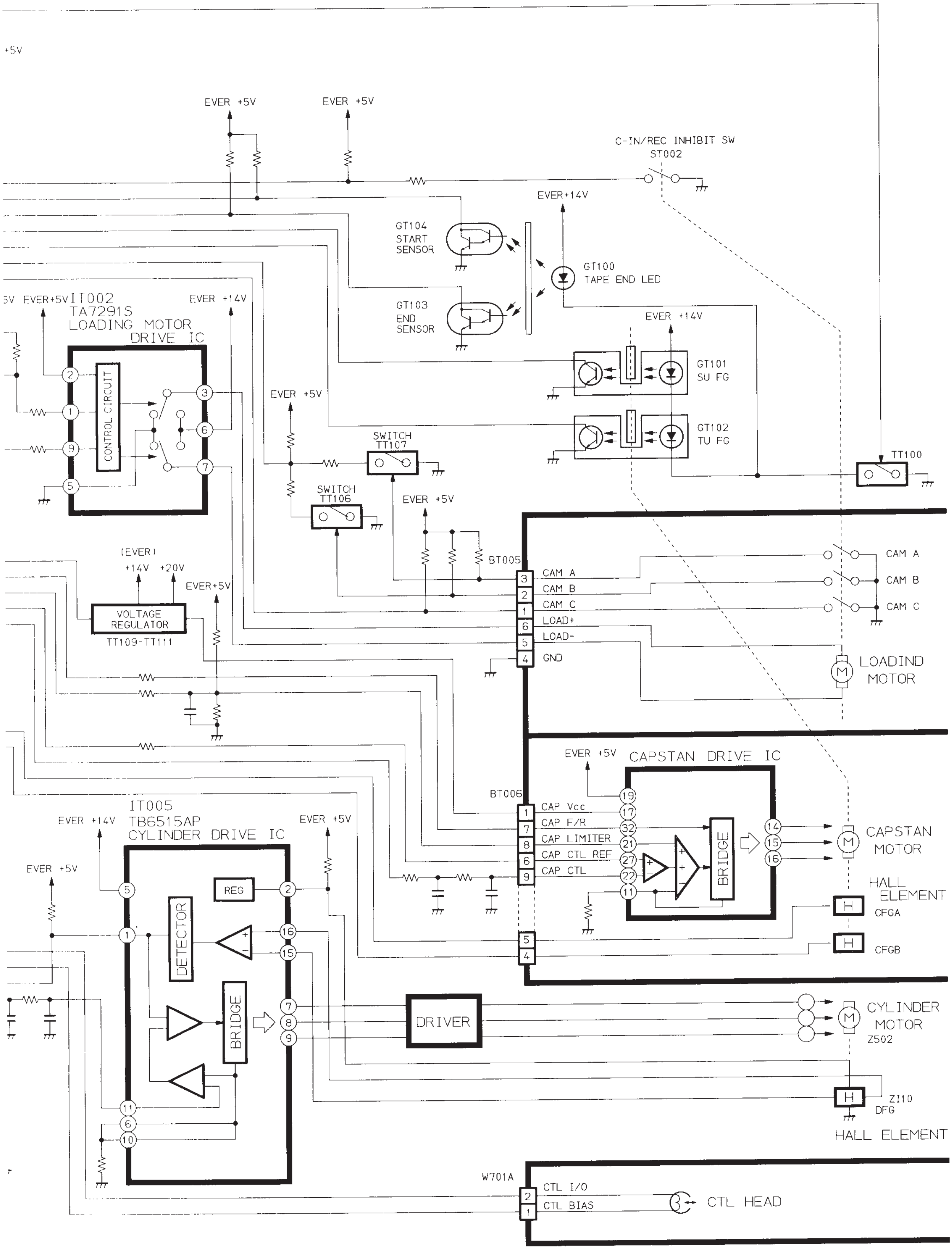


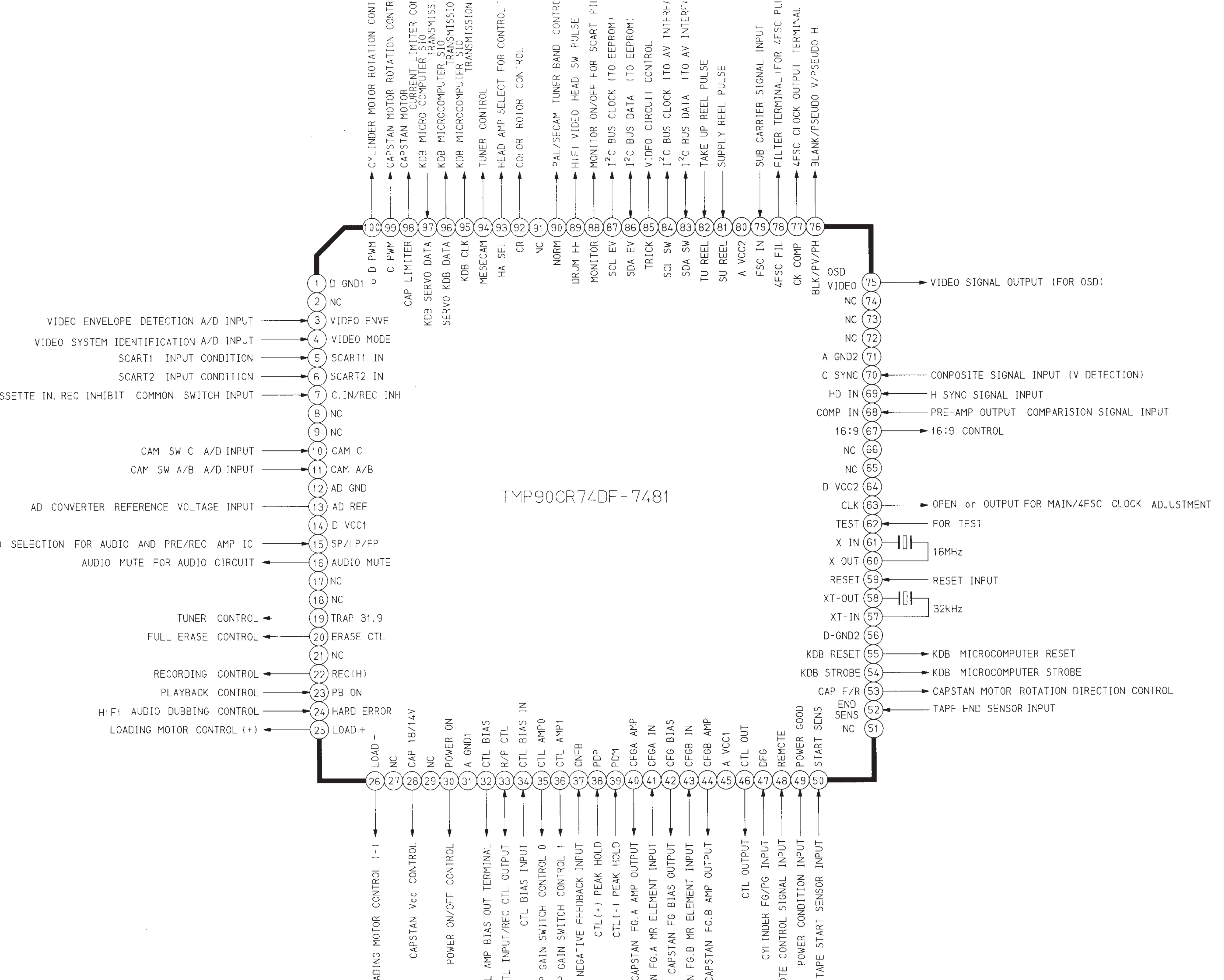
SERVO/LOGIC
0210M
KDB
0005M
MAIN
PK02
BT001
EVER+5V
Vkk
EVER+6.6V
6 EVER+5V
2 -32V
3 F2(-)
5 GND
4 F1(+)
1 EVER+6.6V
TO POWER
KDB RESET
KDB SERVO DATA
SERVO KDB DATA
KDB CLOCK
KDB STROBE
EVER+5V
12 KDB RESET
9 KDB SERVO DATA
8 SERVO KDB DATA
7 KDB CLOCK
10 KDB STROBE
11 REMOTE
TO SERVO/LOGIC
2
1
8
REMOTE CONTROL RECEPTION
0212M
FCB
PK01A
PK01B
KEY4
3
Vin4
POWER
KEY4
1
9

7-4. SERVO/LOGIC BLOCK DIAGRAM



IT001 TMP90CR74DF-7481
MAIN MICROCOMPUTER
BU 5.0V
EVER
D.Vcc1
D.Vcc2
AD REF
A.Vcc1
A.Vcc2
RMT IN
RMT IN CAPTURE
0210M
KDB
BK14
BT001
KDB STROBE
KDB CLOCK
SERVO KDB
KDB SERVO
KDB RESET
DISPLAY SERIAL CONTROL
MODE CONTROL
MECHA CONTROL
SENSOR INPUT CONTROL
C.IN/REC INH
START
END
SU FG
TU FG
CAM A/B
CAM C
LOADING MOTOR CONTROL
LOAD+
LOAD-
PIF
TRAP 31.9
HARD ERROR
NORM
MESECAM
POWER
POWER GOOD
TIME COUNT
POWER ON
TERMINAL
SCART1/AFT IN(MS)
SCART2
16:9
MONITOR
AUDIO
SP/LP/EP
A.MUTE1
ERASE CTL
REC(H)
PB ON
VIDEO
VIDEO MODE
TRICK
CAPSTAN CONTROL
CAP 18/14V
CAP F/R
CAP LIMITER
C FG BIAS
C.PWM
IT004
PST7032MT
RESET IC
RESET
IT003
ST24C04AB1
EEPROM
SDA EV
SCL EV
I²C BUS CONTROL
SDA SW
SCL SW
FG AMP
CFG.A IN
CFG.B IN
QT10
16MH
X OUT
X IN
QT10
32kH
XT IN
XT OUT
HD
QT102
17.7MHz
TT102
AMP
4FSC FIL
FSC IN
OSD VIDEO
OSD CONTROL
CTL AMP
REC TPG
R/P CTL
CSYNC
V.SEP
CYLINDER CONTROL
D FG
D.PWN
V/A SWP
PV/PH/BLK
HASW
COLOR ROTOR
COMPARATOR
Video /Audio CONTROL
VIDEO ENV
TRACKING CONTROL
D.GND1
AD.GND
A.GND1
D.GND2
A.GND2


+5V
EVER +5V
EVER +5V
C-IN/REC INHIBIT SW
ST002
EVER+14V
GT104
START
SENSOR
GT100
TAPE END LED
GT103
END
SENSOR
EVER +14V
GT101
SU FG
GT102
TU FG
TT100
5V EVER+5V IT002
TA7291S
LOADING MOTOR
DRIVE IC
EVER +14V
CONTROL CIRCUIT
EVER +5V
SWITCH
TT107
SWITCH
TT106
EVER +5V
BT005
CAM A
CAM B
CAM C
LOAD+
LOAD-
GND
CAM A
CAM B
CAM C
LOADIND
MOTOR
(EVER)
+14V +20V
EVER+5V
VOLTAGE
REGULATOR
TT109-TT111
EVER +5V
CAPSTAN DRIVE IC
BT006
CAP Vcc
CAP F/R
CAP LIMITER
CAP CTL REF
CAP CTL
BRIDGE
CAPSTAN
MOTOR
HALL
ELEMENT
CFGA
CFGB
IT005
TB6515AP
CYLINDER DRIVE IC
EVER +14V
EVER +5V
EVER +5V
REG
DETECTOR
BRIDGE
DRIVER
CYLINDER
MOTOR
Z502
ZI10
DFG
HALL ELEMENT
W701A
CTL I/O
CTL BIAS
CTL HEAD


TMP90CR74DF-7481
CYLINDER MOTOR ROTATION CONT
CAPSTAN MOTOR ROTATION CONTR
CAPSTAN MOTOR CURRENT LIMITER CON
KDB MICRO COMPUTER SIO TRANSMISSI
KDB MICROCOMPUTER SIO TRANSMISSIO
KDB MICROCOMPUTER SIO TRANSMISSION
TUNER CONTROL
HEAD AMP SELECT FOR CONTROL
COLOR ROTOR CONTROL
PAL/SECAM TUNER BAND CONTRO
HIFI VIDEO HEAD SW PULSE
MONITOR ON/OFF FOR SCART PI
I²C BUS CLOCK (TO EEPROM)
I²C BUS DATA (TO EEPROM)
VIDEO CIRCUIT CONTROL
I²C BUS CLOCK (TO AV INTERFA
I²C BUS DATA (TO AV INTERFA
TAKE UP REEL PULSE
SUPPLY REEL PULSE
SUB CARRIER SIGNAL INPUT
FILTER TERMINAL (FOR 4FSC PL
4FSC CLOCK OUTPUT TERMINAL
BLANK/PSEUDO V/PSEUDO H
100 D PWM
99 C PWM
98 CAP LIMITER
97 KDB SERVO DATA
96 SERVO KDB DATA
95 KDB CLK
94 MESECAM
93 HA SEL
92 CR
91 NC
90 NORM
89 DRUM FF
88 MONITOR
87 SCL EV
86 SDA EV
85 TRICK
84 SCL SW
83 SDA SW
82 TU REEL
81 SU REEL
80 A VCC2
79 FSC IN
78 4FSC FIL
77 CK COMP
76 BLK/PV/PH
1 D GND1 P
2 NC
VIDEO ENVELOPE DETECTION A/D INPUT → 3 VIDEO ENVE
VIDEO SYSTEM IDENTIFICATION A/D INPUT → 4 VIDEO MODE
SCART1 INPUT CONDITION → 5 SCART1 IN
SCART2 INPUT CONDITION → 6 SCART2 IN
SSETTE IN, REC INHIBIT COMMON SWITCH INPUT → 7 C.IN/REC INH
8 NC
9 NC
CAM SW C A/D INPUT → 10 CAM C
CAM SW A/B A/D INPUT → 11 CAM A/B
12 AD GND
AD CONVERTER REFERENCE VOLTAGE INPUT → 13 AD REF
14 D VCC1
SELECTION FOR AUDIO AND PRE/REC AMP IC → 15 SP/LP/EP
AUDIO MUTE FOR AUDIO CIRCUIT ← 16 AUDIO MUTE
17 NC
18 NC
TUNER CONTROL ← 19 TRAP 31.9
FULL ERASE CONTROL ← 20 ERASE CTL
21 NC
RECORDING CONTROL ← 22 REC(H)
PLAYBACK CONTROL ← 23 PB ON
HIFI AUDIO DUBBING CONTROL → 24 HARD ERROR
LOADING MOTOR CONTROL (+) ← 25 LOAD +
26 LOAD - → ADING MOTOR CONTROL (-)
27 NC
28 CAP 18/14V → CAPSTAN Vcc CONTROL
29 NC
30 POWER ON → POWER ON/OFF CONTROL
31 A GND1
32 CTL BIAS → L AMP BIAS OUT TERMINAL
33 R/P CTL ↔ TL INPUT/REC CTL OUTPUT
34 CTL BIAS IN ← CTL BIAS INPUT
35 CTL AMP0 → P GAIN SWITCH CONTROL 0
36 CTL AMP1 → P GAIN SWITCH CONTROL 1
37 CNFB ← NEGATIVE FEEDBACK INPUT
38 PDP ← CTL(+) PEAK HOLD
39 PDM ← CTL(-) PEAK HOLD
40 CFGA AMP → CAPSTAN FG.A AMP OUTPUT
41 CFGA IN ← N FG.A MR ELEMENT INPUT
42 CFG BIAS → CAPSTAN FG BIAS OUTPUT
43 CFGB IN ← N FG.B MR ELEMENT INPUT
44 CFGB AMP → CAPSTAN FG.B AMP OUTPUT
45 A VCC1
46 CTL OUT → CTL OUTPUT
47 DFG ← CYLINDER FG/PG INPUT
48 REMOTE ← OTE CONTROL SIGNAL INPUT
49 POWER GOOD ← POWER CONDITION INPUT
50 START SENS ← TAPE START SENSOR INPUT
51 NC
52 END SENS ← TAPE END SENSOR INPUT
53 CAP F/R → CAPSTAN MOTOR ROTATION DIRECTION CONTROL
54 KDB STROBE → KDB MICROCOMPUTER STROBE
55 KDB RESET → KDB MICROCOMPUTER RESET
56 D-GND2
57 XT-IN
58 XT-OUT
32kHz
59 RESET ← RESET INPUT
60 X OUT
61 X IN
16MHz
62 TEST ← FOR TEST
63 CLK → OPEN or OUTPUT FOR MAIN/4FSC CLOCK ADJUSTMENT
64 D VCC2
65 NC
66 NC
67 16:9 → 16:9 CONTROL
68 COMP IN ← PRE-AMP OUTPUT COMPARISION SIGNAL INPUT
69 HD IN ← H SYNC SIGNAL INPUT
70 C SYNC ← CONPOSITE SIGNAL INPUT (V DETECTION)
71 A GND2
72 NC
73 NC
74 NC
75 OSD VIDEO → VIDEO SIGNAL OUTPUT (FOR OSD)

001 Main Microcomputer Output Polarity

Pin No.	MODE / Pin Name	Act.	SLOT IN	SLOT OUT	Load -ing	Un- load -ing	STOP	STAN D-BY	FF	REW	PLAY SP LP	X2 SP LP	CUE SP LP	REV SP LP	STILL SP LP	SLOW SP LP	REC SP LP	REC PAUSE SP LP	POWER OFF	INIT -IAL
16	A. MUTE1	H	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	L	H	H
25	LOAD FWD	L	L	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
26	LOAD REV	L	H	L	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H
30	POWER ON	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	L
33	R/P CTL	⎍⎍	-	-	-	-	-	-	-	-	-	-	-	-	-	-	⎍⎍	-	-	OPEN
46	CTL OUT	⎍⎍	L	L	L	L	L	L	⎍⎍	←	←	←	←	←	L	_⎍	⎍⎍	L	L	L
53	CAP F/R	-	L	H	L	H	H	H	L	H	L	L	L	H	L	_⎍	L	L	H	L
54	DSP STB	⎍	⎍	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	L
67	S DATA	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	L
76	PV/PH/BLNK	4ST	2ST	←	←	←	←	←	←	←	4ST	←	←	←	←	←	←	←	L	4ST
83	I2C DATA1	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	H
84	I2C CLOCK1	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	H
86	I2C DATA2	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	H
87	I2C CLOCK2	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	H
88	S CLK	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	L
89	D-FF	⎍⎍	⎍⎍	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	OPEN	OPEN
91	LP SEARCH	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L
92	CR	⎍⎍	⎍⎍	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	L	L
95	DSP CLK	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	L
96	DATA M→DSP	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	L
98	CAP LIMITER	PWM	L	L	PWM	←	L	PWM	←	←	←	←	←	←	L	PWM	←	←	L	500m
99	C-ERR	PWM	PWM	PWM	PWM	←	L	L	PWM	←	←	←	←	←	L	PWM	←	L	L	L
100	D-ERR	PWM	L	L	PWM	←	L	PWM	←	←	←	←	←	←	←	←	←	←	L	L

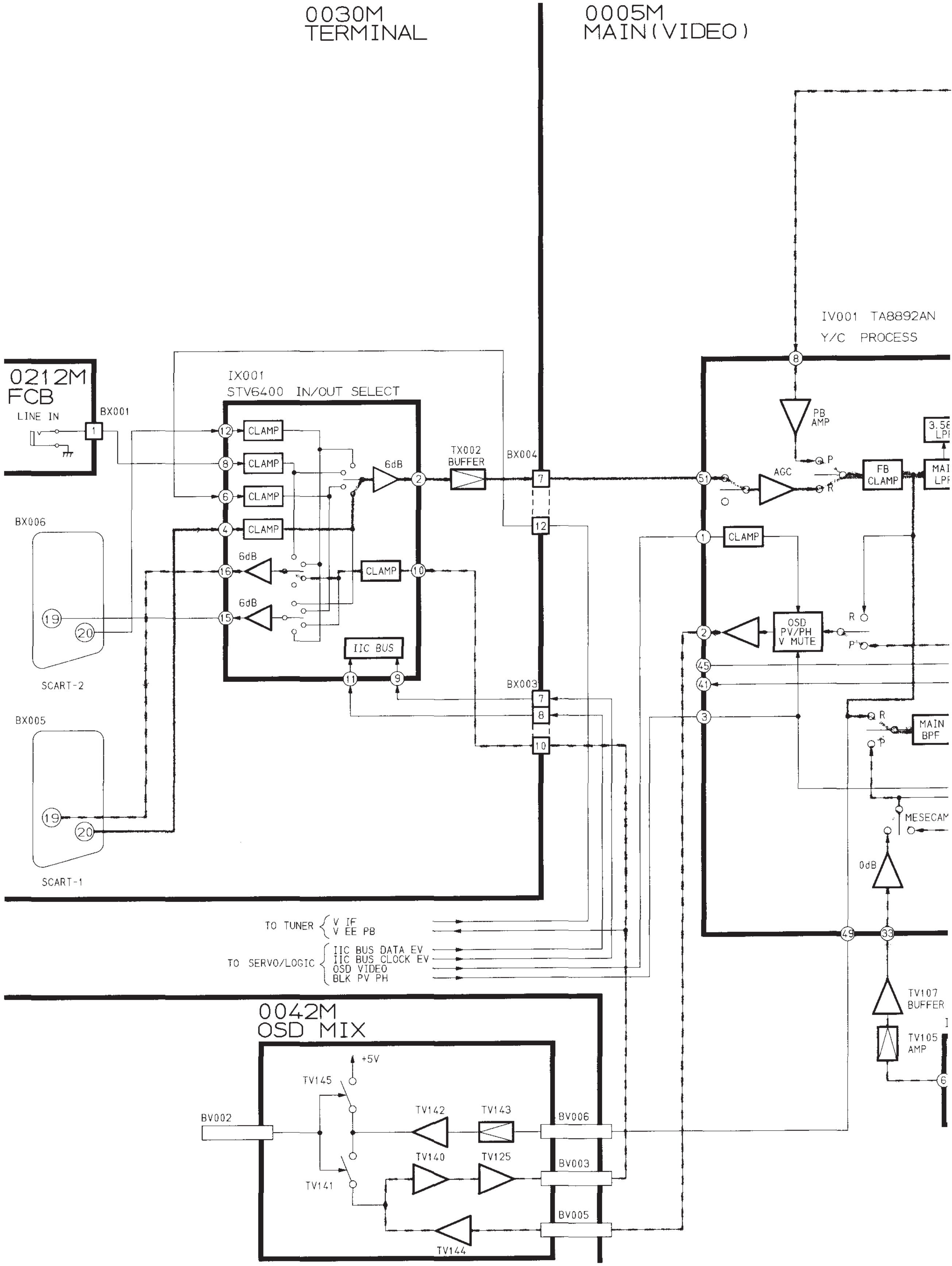
ogic Mode Shift Table

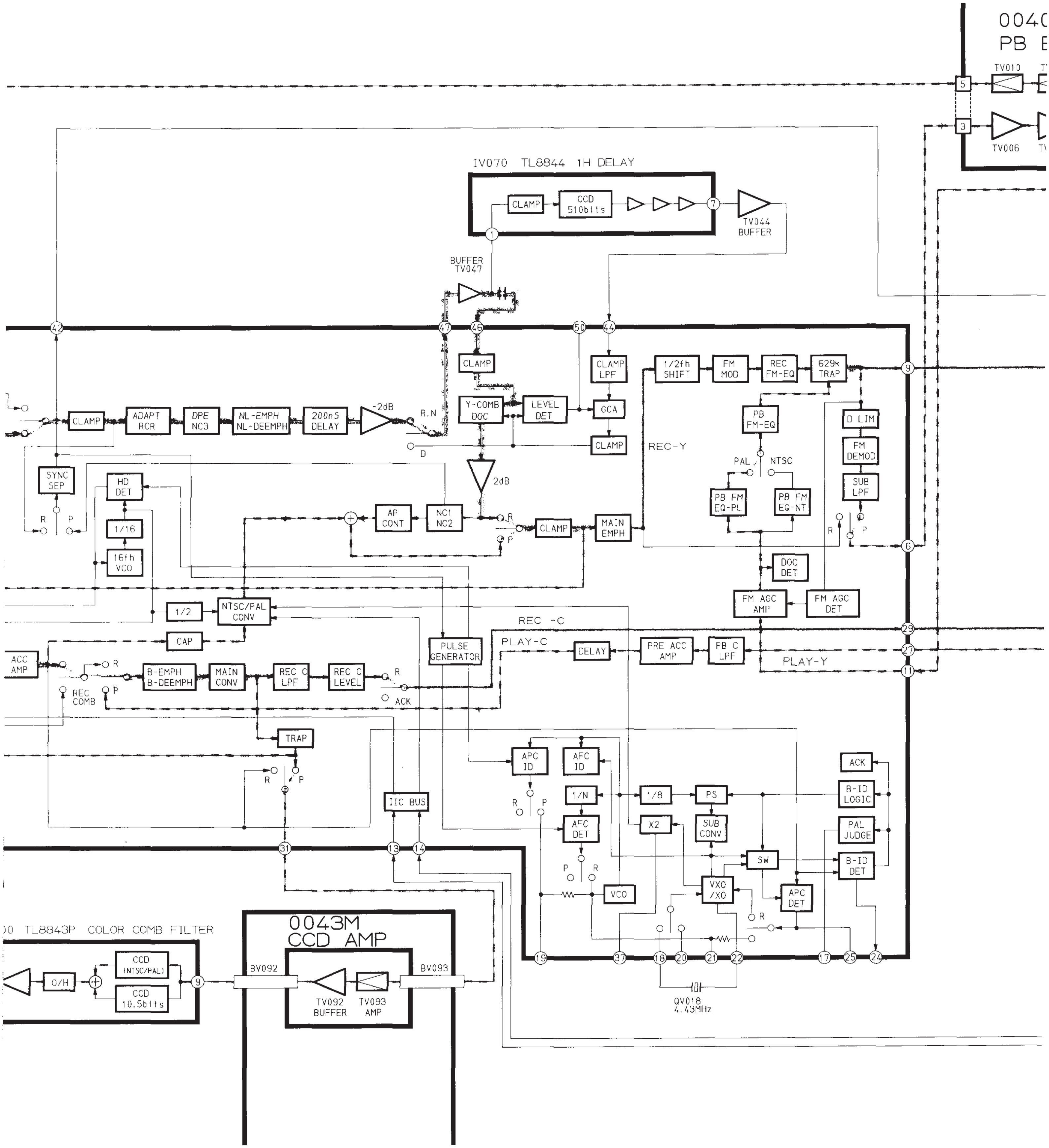
KEY / MODE	POWER	STOP	FF	REW	PLAY	PAUSE	SLOW	REC	EJECT	REMAIN COUNT/TIMER	INDEX	COUNTER RESET	TAPE	
													END	START
POWER OFF	ON	×	×	×	×	×	×	×	○	×	×	×	×	×
STOP	OFF	–	○	○	○	×	×	○	○	○	SERCH	○	S. REW	S. FF
FF	OFF	○	CUE	○	○	×	×	×	○	○	×	○	STOP	×
REW	OFF	○	○	REV	○	×	×	×	○	○	×	○	×	STOP
CUE	OFF	○	※1	REV	○	×	×	×	○	○	×	○	REW	×
REV	OFF	○	CUE	※2	○	×	×	×	○	○	×	○	×	STOP
PLAY	OFF	○	CUE	REV	×	STILL	○	×	○	○	SERCH	○	REW	×
STILL	OFF	○	CUE	REV	FRAME ADV.	PLAY	FRAME ADV.	R. PAUSE	○	○	×	○	REW	×
SLOW	OFF	○	CUE	REV	○	STILL	○	×	○	○	×	○	REW	×
REC	OFF	○	×	×	×	R. PAUSE	×	–	×	○	V. MARK	○	REW	×
REC PAUSE	OFF	○	×	×	×	REC	×	×	×	○	×	○	×	×
VISS MARK	OFF	○	×	×	×	×	×	×	×	×	–	○	REW	×
TIMER STBY	ON	×	×	×	×	×	×	×	×	×	×	×	×	×
TIMER REC	ON	×	×	×	×	×	×	×	×	○	V. MARK	○	STBY	×

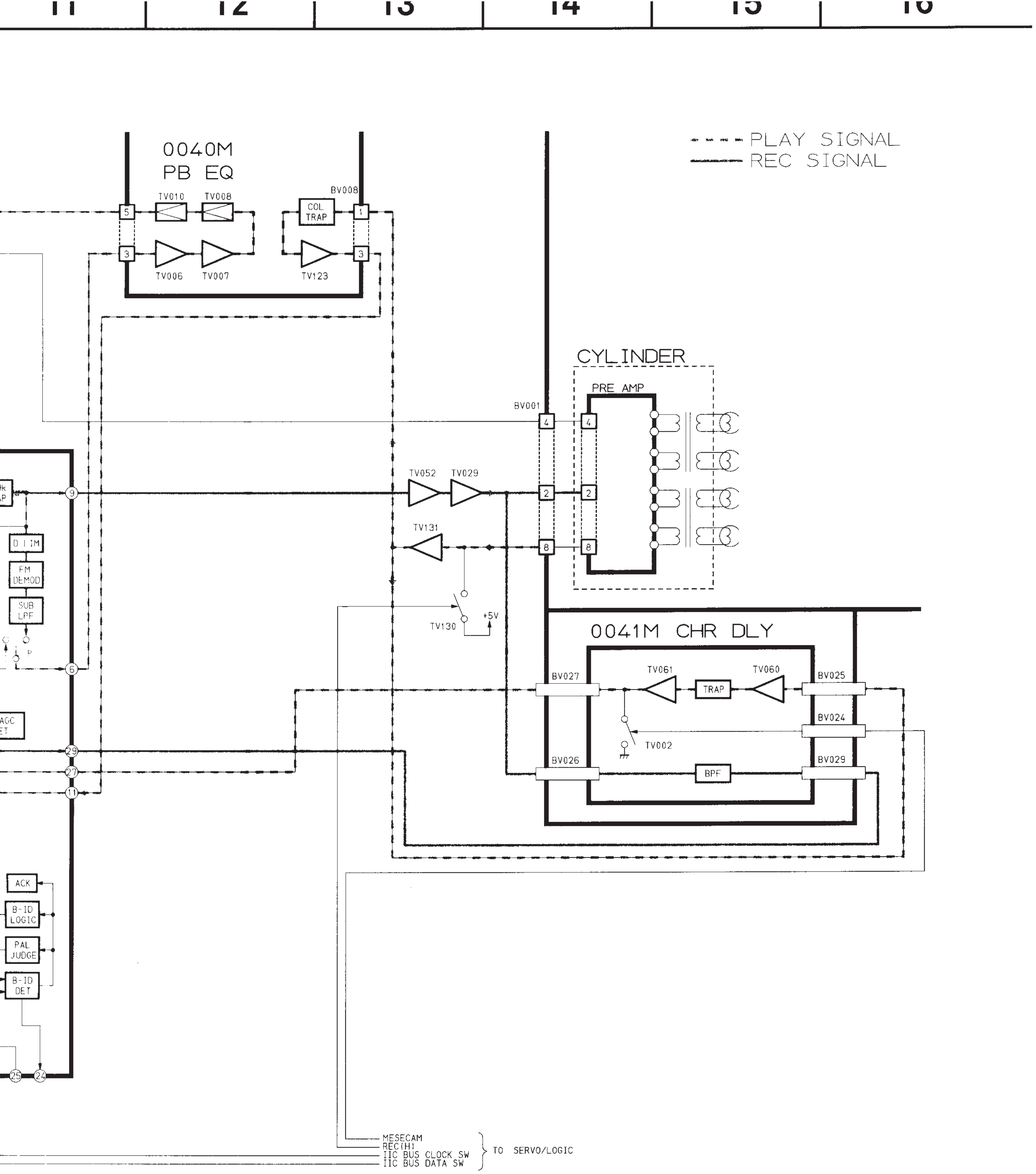
※1 : If pressed within 1 second, FF. If not, all CUE.

※2 : If pressed within 1 second, REW. If not, all REVIEW.

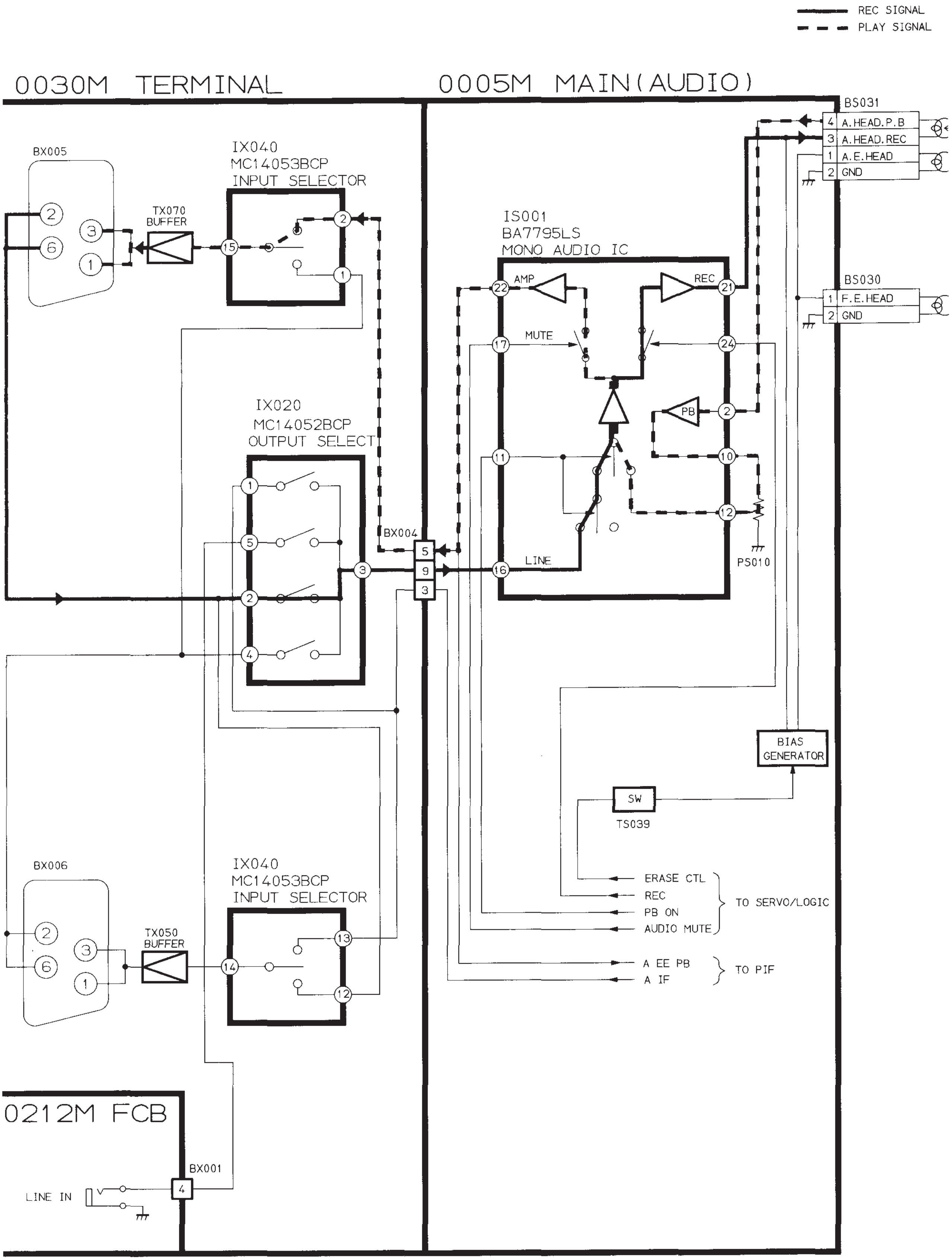
7-5. VIDEO BLOCK DIAGRAM


0030M
TERMINAL
0005M
MAIN(VIDEO)
0212M
FCB
LINE IN
BX001
IX001
STV6400 IN/OUT SELECT
CLAMP
CLAMP
CLAMP
CLAMP
6dB
6dB
6dB
CLAMP
IIC BUS
TX002
BUFFER
BX004
BX006
SCART-2
BX005
SCART-1
BX003
IV001 TA8892AN
Y/C PROCESS
PB
AMP
AGC
P
R
FB
CLAMP
CLAMP
OSD
PV/PH
V MUTE
R
P
MAIN
BPF
MESECAM
0dB
TV107
BUFFER
TV105
AMP
TO TUNER
V IF
V EE PB
TO SERVO/LOGIC
IIC BUS DATA EV
IIC BUS CLOCK EV
OSD VIDEO
BLK PV PH
0042M
OSD MIX
+5V
TV145
TV141
BV002
TV142
TV143
TV140
TV125
TV144
BV006
BV003
BV005

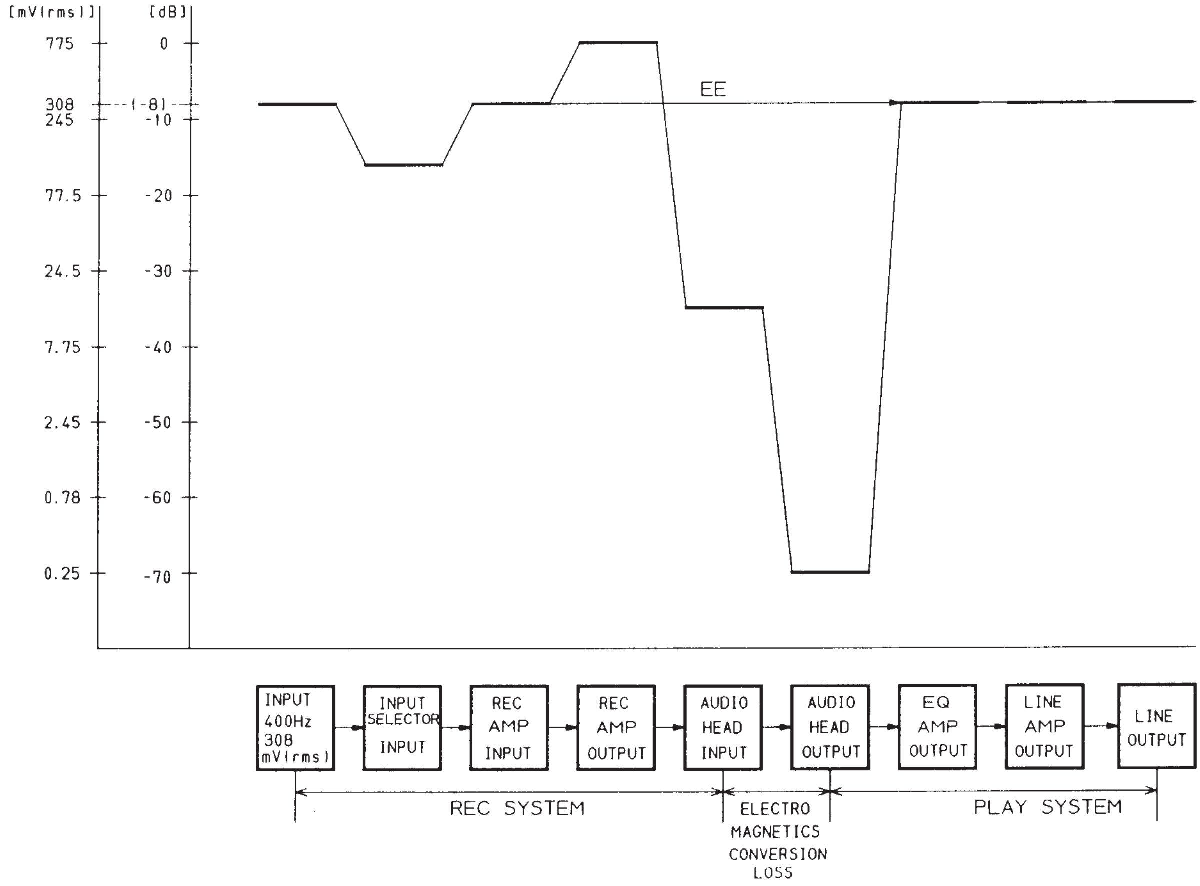

0040
PB
TV010
5
3
TV006
IV070 TL8844 1H DELAY
CLAMP
CCD 510bits
7
1
TV044 BUFFER
BUFFER TV047
42
47
46
50
44
CLAMP
CLAMP LPF
1/2fh SHIFT
FM MOD
REC FM-EQ
629k TRAP
9
CLAMP
ADAPT RCR
DPE NC3
NL-EMPH NL-DEEMPH
200nS DELAY
-2dB
R.N
Y-COMB DOC
LEVEL DET
GCA
CLAMP
D
REC-Y
PB FM-EQ
PAL
NTSC
D LIM
FM DEMOD
SUB LPF
SYNC SEP
HD DET
2dB
PB FM EQ-PL
PB FM EQ-NT
R
P
1/16
AP CONT
NC1 NC2
CLAMP
MAIN EMPH
16fh VCO
6
DOC DET
FM AGC AMP
FM AGC DET
1/2
NTSC/PAL CONV
REC -C
29
CAP
PULSE GENERATOR
PLAY-C
DELAY
PRE ACC AMP
PB C LPF
27
PLAY-Y
11
ACC AMP
B-EMPH B-DEEMPH
MAIN CONV
REC C LPF
REC C LEVEL
REC COMB
ACK
TRAP
APC ID
AFC ID
ACK
B-ID LOGIC
IIC BUS
1/N
1/8
PS
X2
AFC DET
SUB CONV
PAL JUDGE
SW
B-ID DET
31
13
14
VCO
VXO /XO
APC DET
19
37
18
20
21
22
17
25
24
QV018 4.43MHz
00 TL8843P COLOR COMB FILTER
0/H
CCD (NTSC/PAL)
CCD 10.5bits
9
0043M CCD AMP
BV092
BV093
TV092 BUFFER
TV093 AMP


11
12
13
14
15
16
PLAY SIGNAL
REC SIGNAL
0040M
PB EQ
TV010
TV008
COL TRAP
BV008
5
1
3
3
TV006
TV007
TV123
CYLINDER
PRE AMP
BV001
4
4
TV052
TV029
2
2
TV131
8
8
TV130
+5V
0041M CHR DLY
BV027
TV061
TRAP
TV060
BV025
BV024
TV002
BV026
BPF
BV029
D LIM
FM DEMOD
SUB LPF
AGC
9
6
29
27
11
ACK
B-ID LOGIC
PAL JUDGE
B-ID DET
25
24
MESECAM
REC(H)
IIC BUS CLOCK SW
IIC BUS DATA SW
TO SERVO/LOGIC

7-6. Audio Block Diagram


REC SIGNAL
PLAY SIGNAL
0030M TERMINAL
0005M MAIN(AUDIO)
BX005
2
6
3
1
TX070
BUFFER
IX040
MC14053BCP
INPUT SELECTOR
15
2
1
IX020
MC14052BCP
OUTPUT SELECT
1
5
2
4
3
BX004
5
9
3
IS001
BA7795LS
MONO AUDIO IC
AMP
REC
22
21
MUTE
17
24
PB
2
11
10
12
LINE
16
PS010
BS031
4 A.HEAD.P.B
3 A.HEAD.REC
1 A.E.HEAD
2 GND
BS030
1 F.E.HEAD
2 GND
BIAS
GENERATOR
SW
TS039
ERASE CTL
REC
PB ON
AUDIO MUTE
TO SERVO/LOGIC
A EE PB
A IF
TO PIF
BX006
2
6
3
1
TX050
BUFFER
IX040
MC14053BCP
INPUT SELECTOR
14
13
12
0212M FCB
BX001
4
LINE IN

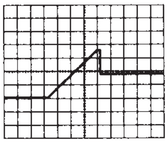
7-6-1. Conventional Audio Level Chart



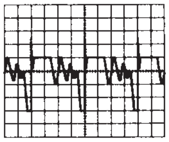
8. CIRCUIT DIAGRAMS

8-1. Power Circuit Diagram

① IP002, Pin ① D-7



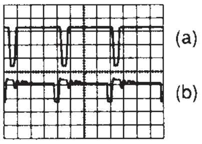
② TP001 COLLECTOR D-5



③ IP002

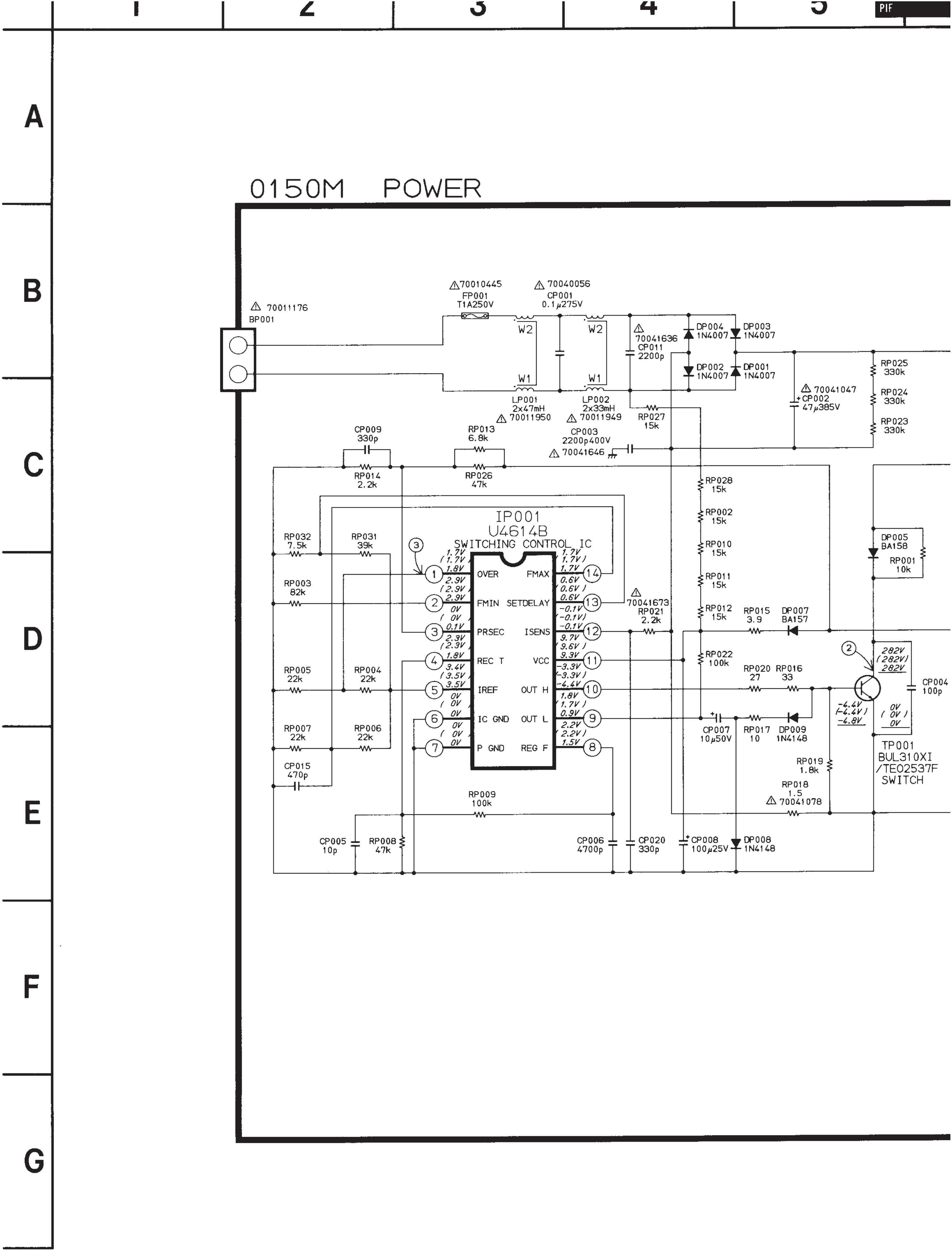
(a) Pin ⑦ E-8

(b) Pin ⑥ E-8

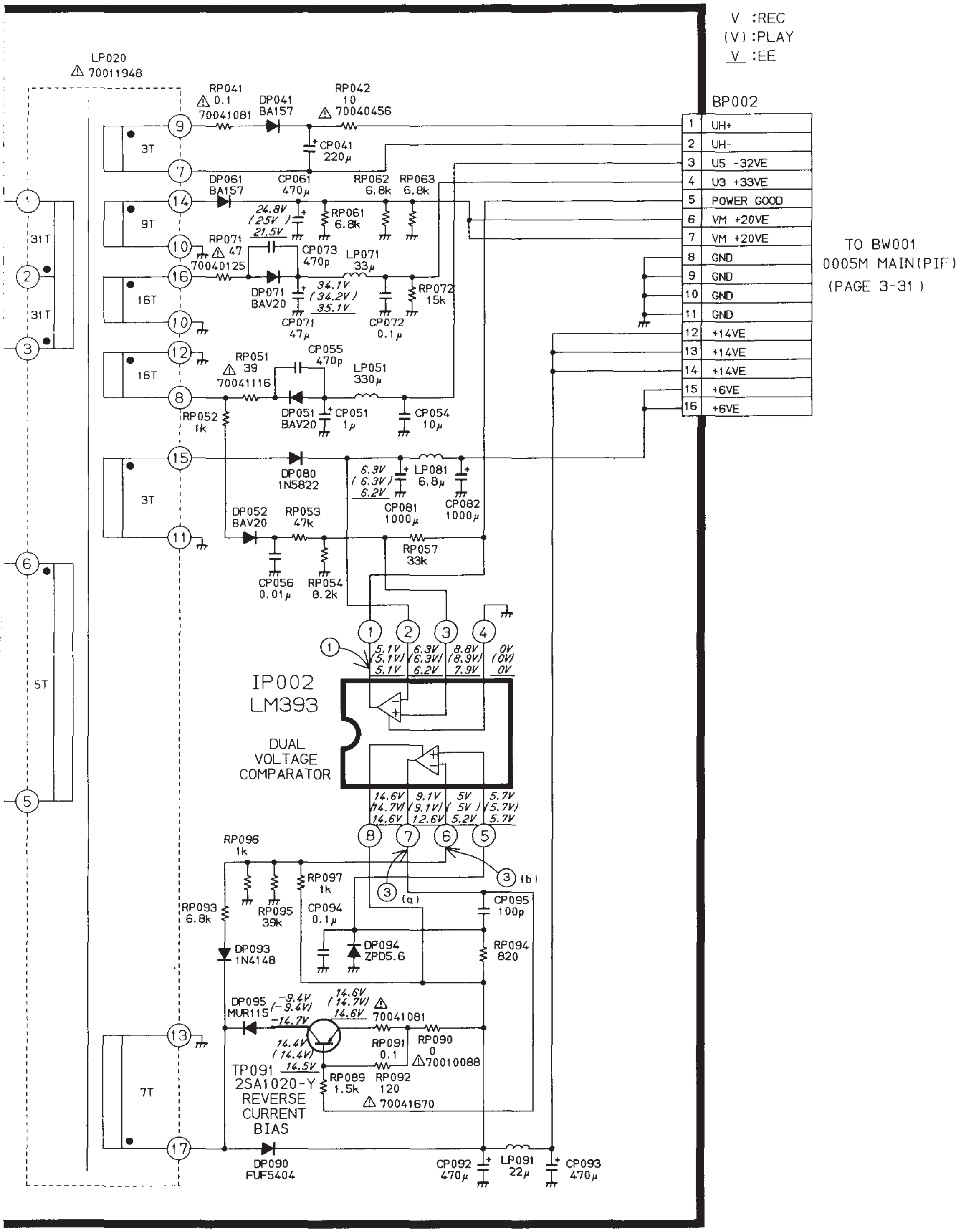


PIF

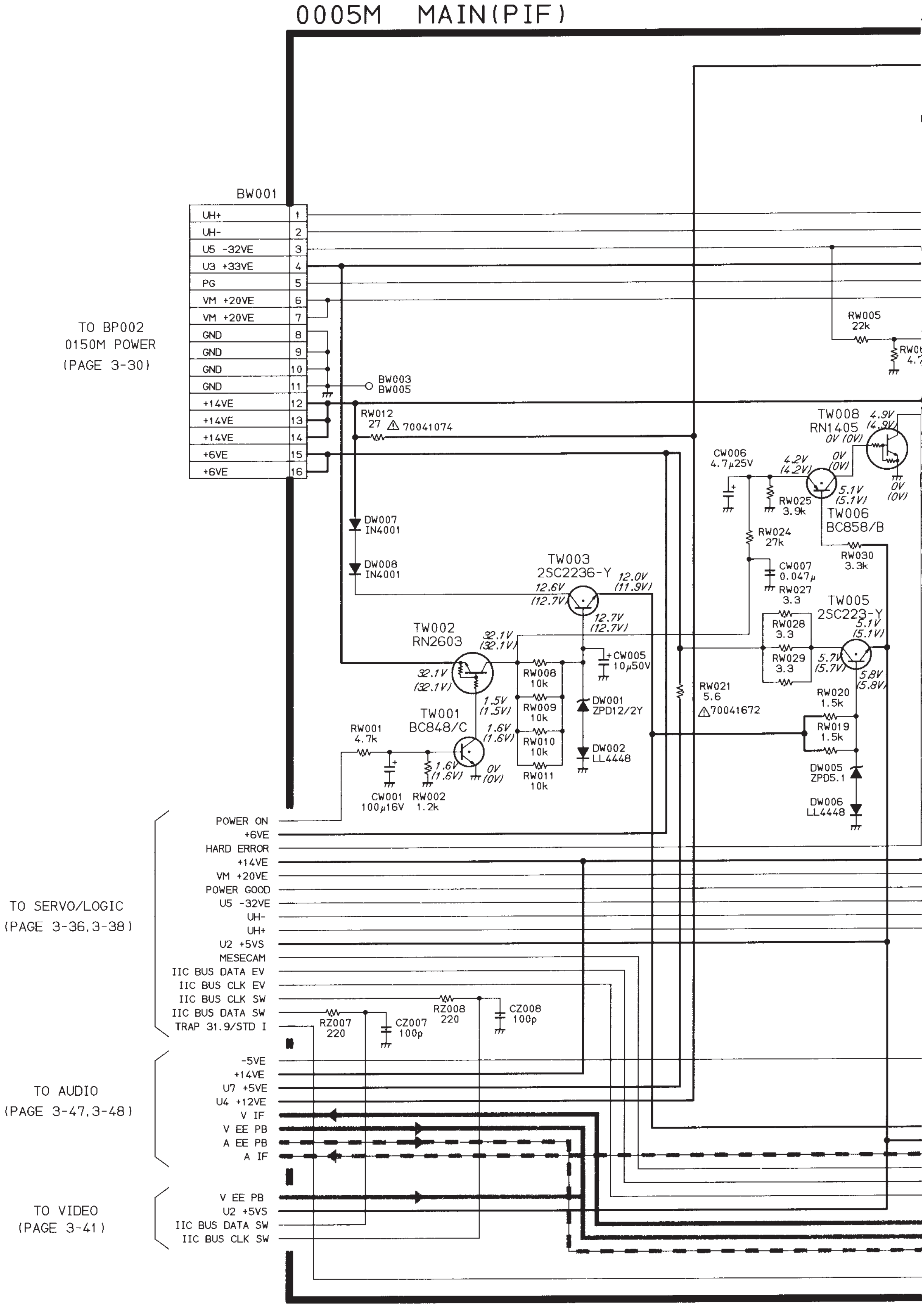
0150M POWER

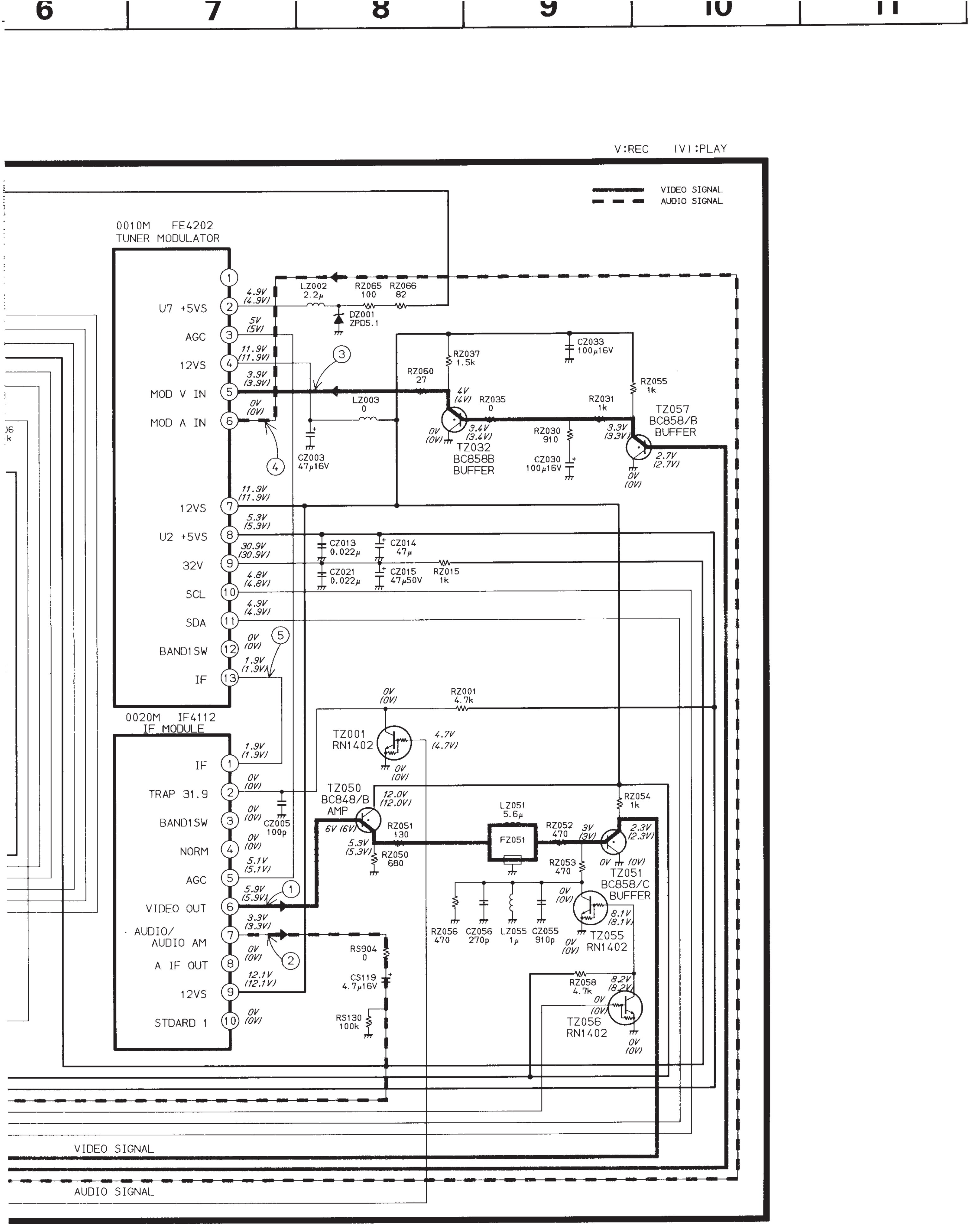


1
2
3
4
5
A
B
C
D
E
F
G
⚠ 70011176
BP001
⚠70010445
FP001
T1A250V
⚠ 70040056
CP001
0.1µ275V
W2
W1
W2
W1
LP001
2x47mH
⚠ 70011950
LP002
2x33mH
⚠ 70011949
⚠ 70041636
CP011
2200p
DP004
1N4007
DP003
1N4007
DP002
1N4007
DP001
1N4007
RP027
15k
CP003
2200p400V
⚠ 70041646
⚠ 70041047
CP002
47µ385V
RP025
330k
RP024
330k
RP023
330k
CP009
330p
RP014
2.2k
RP013
6.8k
RP026
47k
RP028
15k
RP002
15k
RP010
15k
RP011
15k
RP012
15k
RP022
100k
IP001
U4614B
SWITCHING CONTROL IC
③
RP032
7.5k
RP031
39k
RP003
82k
RP005
22k
RP004
22k
RP007
22k
RP006
22k
CP015
470p
1 OVER 1.7V (1.7V) 1.8V
2 FMIN 2.9V (2.9V) 2.9V
3 PRSEC 0V (0V) 0.1V
4 REC T 2.3V (2.3V) 1.8V
5 IREF 3.4V (3.5V) 3.5V
6 IC GND 0V (0V) 0V
7 P GND 0V (0V) 0V
14 FMAX 1.7V (1.7V) 1.7V
13 SETDELAY 0.6V (0.6V) 0.6V
12 ISENS -0.1V (-0.1V) -0.1V
11 VCC 9.7V (9.6V) 9.3V
10 OUT H -3.3V (-3.3V) -4.4V
9 OUT L 1.8V (1.7V) 0.9V
8 REG F 2.2V (2.2V) 1.5V
⚠ 70041673
RP021
2.2k
RP015
3.9
DP007
BA157
DP005
BA158
RP001
10k
RP020
27
RP016
33
②
282V (282V) 282V
-4.4V (-4.4V) -4.8V
0V (0V) 0V
CP004
100p
CP007
10µ50V
RP017
10
DP009
1N4148
TP001
BUL310XI
/TE02537F
SWITCH
RP019
1.8k
RP018
1.5
⚠ 70041078
RP009
100k
CP005
10p
RP008
47k
CP006
4700p
CP020
330p
CP008
100µ25V
DP008
1N4148

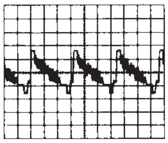

V :REC
(V) :PLAY
V :EE
LP020
⚠ 70011948
RP041 ⚠ 0.1 70041081
DP041 BA157
RP042 10 ⚠ 70040456
CP041 220μ
3T
9T
16T
31T
5T
7T
DP061 BA157
CP061 470μ
RP062 6.8k
RP063 6.8k
24.8V (25V) 21.5V
RP061 6.8k
RP071 ⚠ 47 70040125
CP073 470p
LP071 33μ
DP071 BAV20
34.1V (34.2V) 35.1V
RP072 15k
CP071 47μ
CP072 0.1μ
RP051 ⚠ 39 70041116
CP055 470p
LP051 330μ
DP051 BAV20
CP051 1μ
CP054 10μ
RP052 1k
DP080 1N5822
6.3V (6.3V) 6.2V
LP081 6.8μ
CP081 1000μ
CP082 1000μ
DP052 BAV20
RP053 47k
RP057 33k
CP056 0.01μ
RP054 8.2k
5.1V (5.1V) 5.1V
6.3V (6.3V) 6.2V
8.8V (8.9V) 7.9V
0V (0V) 0V
IP002
LM393
DUAL VOLTAGE COMPARATOR
14.6V (14.7V) 14.6V
9.1V (9.1V) 12.6V
5V (5V) 5.2V
5.7V (5.7V) 5.7V
③ (b)
③ (a)
RP096 1k
RP097 1k
RP093 6.8k
RP095 39k
CP094 0.1μ
CP095 100p
DP093 1N4148
DP094 ZPD5.6
RP094 820
DP095 MUR115
-9.4V (-9.4V) -14.7V
14.6V (14.7V) 14.6V
⚠ 70041081
14.4V (14.4V) 14.5V
RP091 0.1
RP090 0 ⚠ 70010088
TP091 2SA1020-Y REVERSE CURRENT BIAS
RP089 1.5k
RP092 120 ⚠ 70041670
DP090 FUF5404
CP092 470μ
LP091 22μ
CP093 470μ
BP002
1 UH+
2 UH-
3 U5 -32VE
4 U3 +33VE
5 POWER GOOD
6 VM +20VE
7 VM +20VE
8 GND
9 GND
10 GND
11 GND
12 +14VE
13 +14VE
14 +14VE
15 +6VE
16 +6VE
TO BW001
0005M MAIN(PIF)
(PAGE 3-31)

8-2. PIF Circuit Diagram


1
2
3
4
5
A
B
C
D
E
F
G
0005M MAIN(PIF)
BW001
UH+ 1
UH- 2
U5 -32VE 3
U3 +33VE 4
PG 5
VM +20VE 6
VM +20VE 7
GND 8
GND 9
GND 10
GND 11
+14VE 12
+14VE 13
+14VE 14
+6VE 15
+6VE 16
TO BP002
0150M POWER
(PAGE 3-30)
BW003
BW005
RW012
27 ⚠ 70041074
RW005
22k
TW008 4.9V (4.9V)
RN1405
0V (0V)
CW006
4.7μ25V
4.2V (4.2V)
0V (0V)
5.1V (5.1V)
0V (0V)
RW025
3.9k
TW006
BC858/B
RW024
27k
RW030
3.3k
CW007
0.047μ
RW027
3.3
DW007
IN4001
DW008
IN4001
TW003
2SC2236-Y
12.0V (11.9V)
12.6V (12.7V)
12.7V (12.7V)
TW005
2SC223-Y
5.1V (5.1V)
RW028
3.3
RW029
3.3
5.7V (5.7V)
5.8V (5.8V)
TW002
RN2603
32.1V (32.1V)
32.1V (32.1V)
CW005
10μ50V
RW008
10k
RW009
10k
RW010
10k
RW011
10k
DW001
ZPD12/2Y
DW002
LL4448
RW021
5.6
⚠70041672
RW020
1.5k
RW019
1.5k
DW005
ZPD5.1
DW006
LL4448
TW001
BC848/C
1.5V (1.5V)
1.6V (1.6V)
1.6V (1.6V)
0V (0V)
RW001
4.7k
CW001
100μ16V
RW002
1.2k
TO SERVO/LOGIC
(PAGE 3-36,3-38)
POWER ON
+6VE
HARD ERROR
+14VE
VM +20VE
POWER GOOD
U5 -32VE
UH-
UH+
U2 +5VS
MESECAM
IIC BUS DATA EV
IIC BUS CLK EV
IIC BUS CLK SW
IIC BUS DATA SW
TRAP 31.9/STD I
RZ007
220
CZ007
100p
RZ008
220
CZ008
100p
TO AUDIO
(PAGE 3-47,3-48)
-5VE
+14VE
U7 +5VE
U4 +12VE
V IF
V EE PB
A EE PB
A IF
TO VIDEO
(PAGE 3-41)
V EE PB
U2 +5VS
IIC BUS DATA SW
IIC BUS CLK SW


6
7
8
9
10
11
V:REC (V):PLAY
VIDEO SIGNAL
AUDIO SIGNAL
0010M FE4202
TUNER MODULATOR
U7 +5VS
AGC
12VS
MOD V IN
MOD A IN
12VS
U2 +5VS
32V
SCL
SDA
BAND1SW
IF
4.9V (4.9V)
5V (5V)
11.9V (11.9V)
3.9V (3.9V)
0V (0V)
11.9V (11.9V)
5.3V (5.3V)
30.9V (30.9V)
4.8V (4.8V)
4.9V (4.9V)
0V (0V)
1.9V (1.9V)
LZ002 2.2μ
RZ065 100
RZ066 82
DZ001 ZPD5.1
CZ033 100μ16V
RZ037 1.5k
RZ060 27
RZ055 1k
LZ003 0
4V (4V)
RZ035 0
RZ031 1k
TZ057 BC858/B BUFFER
0V (0V)
3.4V (3.4V)
TZ032 BC858B BUFFER
RZ030 910
3.3V (3.3V)
2.7V (2.7V)
CZ030 100μ16V
CZ003 47μ16V
CZ013 0.022μ
CZ014 47μ
CZ021 0.022μ
CZ015 47μ50V
RZ015 1k
0V (0V)
RZ001 4.7k
0020M IF4112
IF MODULE
IF
TRAP 31.9
BAND1SW
NORM
AGC
VIDEO OUT
AUDIO/ AUDIO AM
A IF OUT
12VS
STDARD 1
1.9V (1.9V)
0V (0V)
0V (0V)
0V (0V)
5.1V (5.1V)
5.9V (5.9V)
3.3V (3.3V)
0V (0V)
12.1V (12.1V)
0V (0V)
TZ001 RN1402
4.7V (4.7V)
0V (0V)
TZ050 BC848/B AMP
12.0V (12.0V)
CZ005 100p
6V (6V)
RZ051 130
5.3V (5.3V)
RZ050 680
LZ051 5.6μ
FZ051
RZ052 470
3V (3V)
RZ054 1k
2.3V (2.3V)
0V (0V)
RZ053 470
TZ051 BC858/C BUFFER
0V (0V)
8.1V (8.1V)
TZ055 RN1402
RZ056 470
CZ056 270p
LZ055 1μ
CZ055 910p
0V (0V)
RS904 0
CS119 4.7μ16V
RS130 100k
RZ058 4.7k
8.2V (8.2V)
0V (0V)
TZ056 RN1402
0V (0V)
①
②
③
④
⑤
VIDEO SIGNAL
AUDIO SIGNAL

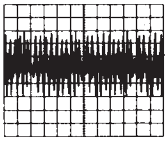
① 0020M, Pin ⑥ E-8



VIDEO OUT

V:1V/div
H:20μs/div

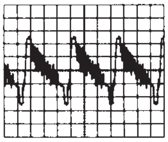
② 0020M, Pin ⑦ F-8



AUDIO

V:20mV/div
H:5ms/div

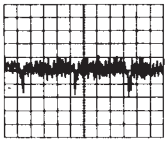
③ 0010M, Pin ⑤ B-8



MOD V IN

V:200mV/div
H:20μs/div

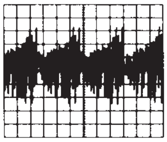
④ 0010M, Pin ⑥ C-8



MOD A IN

V:500mV/div
H:5ms/div

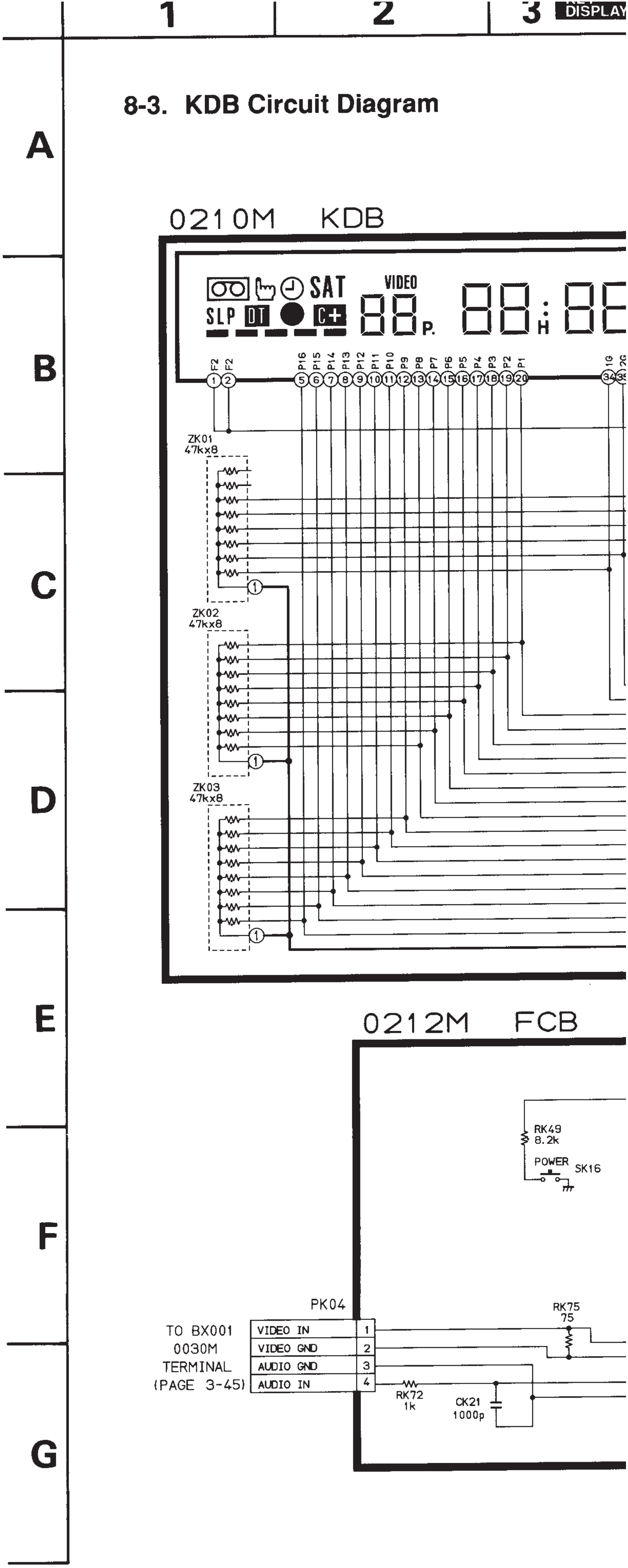
⑤ 0010M, Pin ⑬ D-8

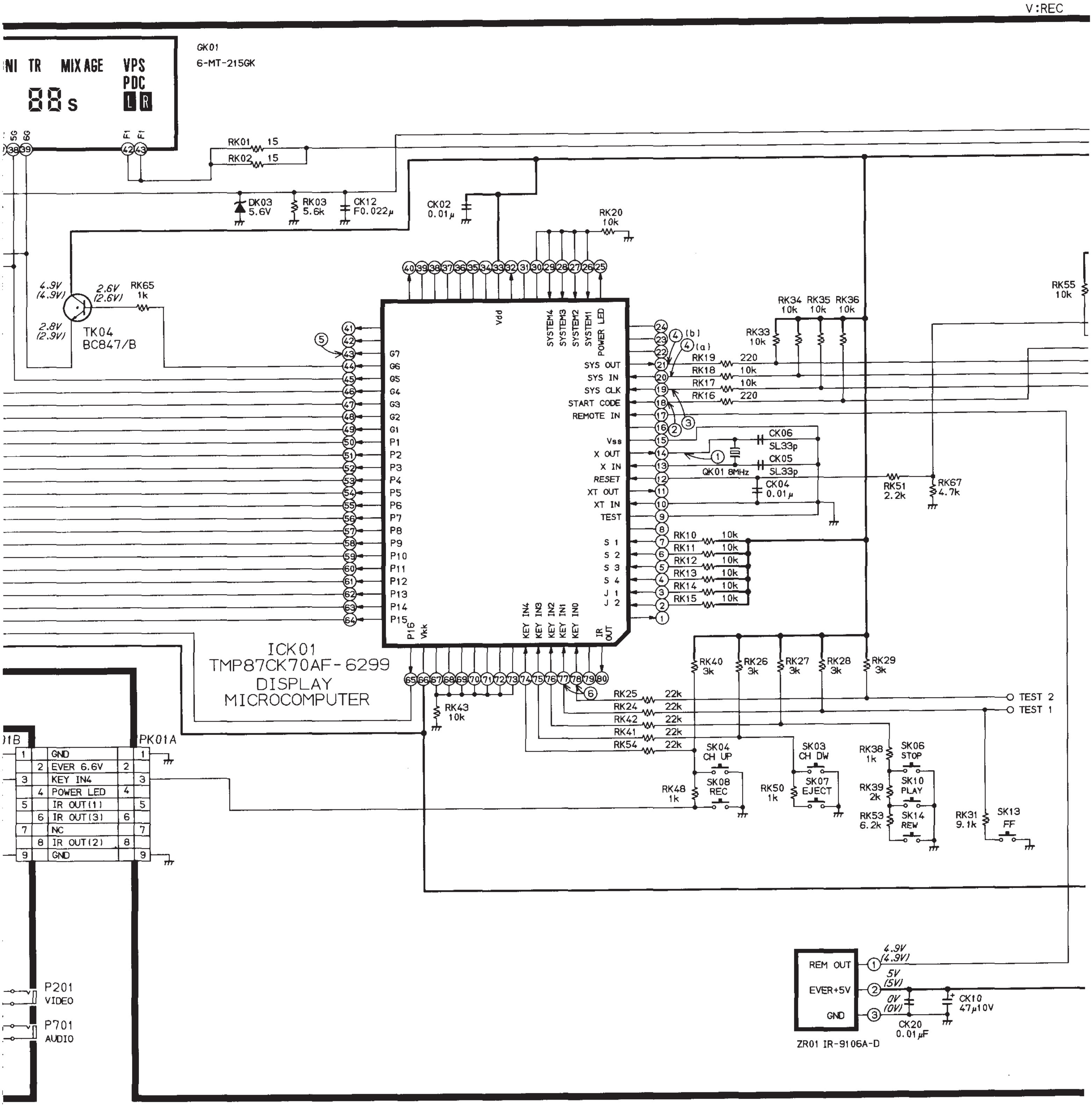


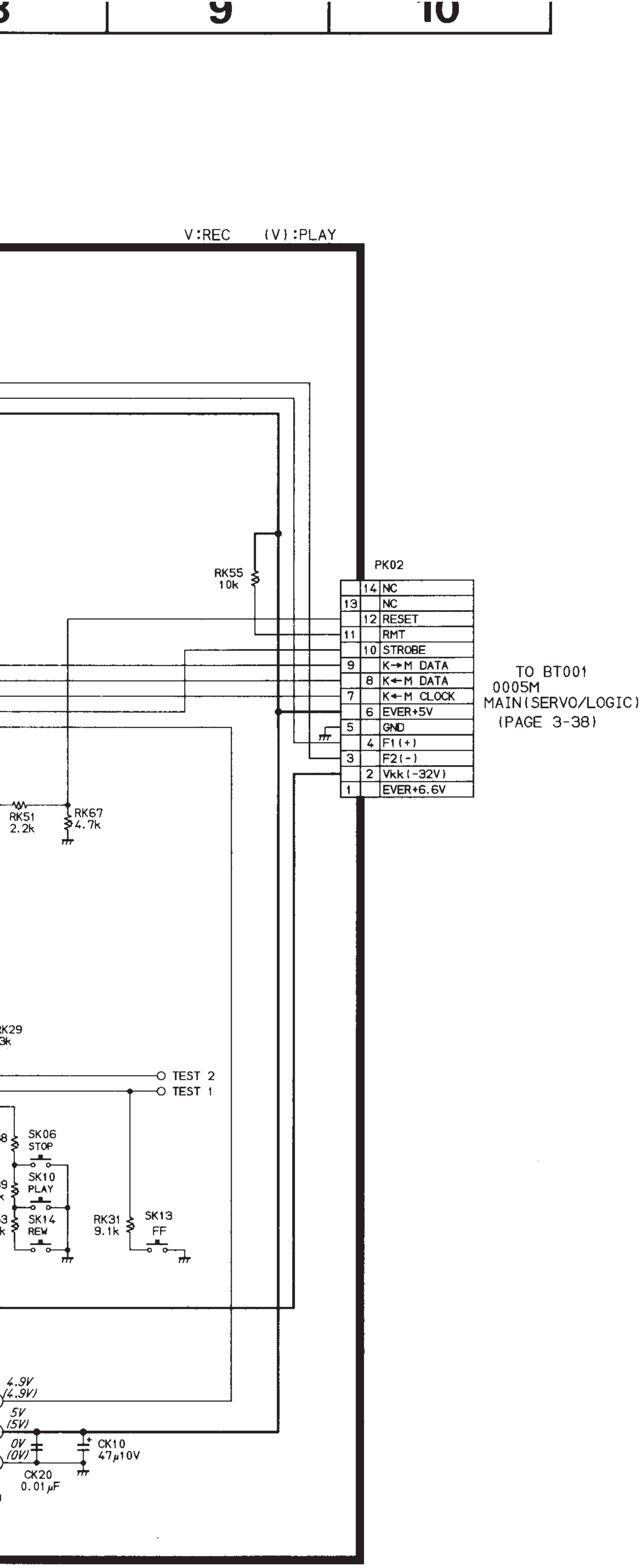
IF

V:20mV/div
H:20μs/div

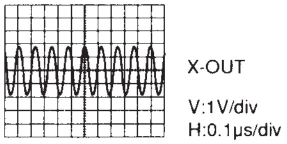
8-3. KDB Circuit Diagram


1
2
3
DISPLAY
A
B
C
D
E
F
G
0210M KDB
SAT
VIDEO
SLP
DT
C+
88
P.
88:8
H
F2
F2
P16
P15
P14
P13
P12
P11
P10
P9
P8
P7
P6
P5
P4
P3
P2
P1
1G
2G
ZK01
47kx8
ZK02
47kx8
ZK03
47kx8
0212M FCB
RK49
8.2k
POWER
SK16
PK04
TO BX001
0030M
TERMINAL
(PAGE 3-45)
VIDEO IN 1
VIDEO GND 2
AUDIO GND 3
AUDIO IN 4
RK75
75
RK72
1k
CK21
1000p

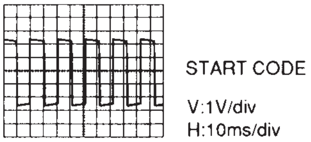

V:REC
NI TR MIX AGE VPS PDC
88 s
L R
GK01
6-MT-215GK
RK01 15
RK02 15
DK03 5.6V
RK03 5.6k
CK12 F0.022μ
CK02 0.01μ
RK20 10k
4.9V (4.9V)
2.6V (2.6V)
2.8V (2.9V)
RK65 1k
TK04 BC847/B
G7 G6 G5 G4 G3 G2 G1
P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13 P14 P15 P16
Vkk
Vdd
SYSTEM4 SYSTEM3 SYSTEM2 SYSTEM1 POWER LED
SYS OUT
SYS IN
SYS CLK
START CODE
REMOTE IN
Vss
X OUT
X IN
RESET
XT OUT
XT IN
TEST
S 1 S 2 S 3 S 4 J 1 J 2
KEY IN4 KEY IN3 KEY IN2 KEY IN1 KEY IN0
IR OUT
ICK01
TMP87CK70AF-6299
DISPLAY
MICROCOMPUTER
RK34 10k RK35 10k RK36 10k
RK33 10k
RK19 220
RK18 10k
RK17 10k
RK16 220
CK06 SL33p
CK05 SL33p
QK01 8MHz
CK04 0.01μ
RK51 2.2k
RK67 4.7k
RK55 10k
RK10 10k
RK11 10k
RK12 10k
RK13 10k
RK14 10k
RK15 10k
RK40 3k
RK26 3k
RK27 3k
RK28 3k
RK29 3k
RK43 10k
RK25 22k
RK24 22k
RK42 22k
RK41 22k
RK54 22k
TEST 2
TEST 1
SK04 CH UP
SK03 CH DW
SK08 REC
SK07 EJECT
RK48 1k
RK50 1k
RK38 1k
RK39 2k
RK53 6.2k
SK06 STOP
SK10 PLAY
SK14 REW
RK31 9.1k
SK13 FF
01B
PK01A
GND
EVER 6.6V
KEY IN4
POWER LED
IR OUT(1)
IR OUT(3)
NC
IR OUT(2)
GND
P201 VIDEO
P701 AUDIO
REM OUT
EVER+5V
GND
4.9V (4.9V)
5V (5V)
0V (0V)
CK10 47μ10V
CK20 0.01μF
ZR01 IR-9106A-D


9
10
V:REC (V):PLAY
PK02
14 NC
13 NC
12 RESET
11 RMT
10 STROBE
9 K→M DATA
8 K←M DATA
7 K←M CLOCK
6 EVER+5V
5 GND
4 F1(+)
3 F2(-)
2 Vkk(-32V)
1 EVER+6.6V
TO BT001
0005M
MAIN(SERVO/LOGIC)
(PAGE 3-38)
RK55 10k
RK51 2.2k
RK67 4.7k
TEST 2
TEST 1
SK06 STOP
SK10 PLAY
SK14 REW
RK31 9.1k
SK13 FF
4.9V (4.9V)
5V (5V)
0V (0V)
CK10 47μ10V
CK20 0.01μF

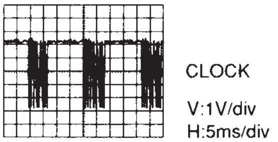
① ICK01,Pin ⑭ D-7



② ICK01,Pin ⑱ D-7



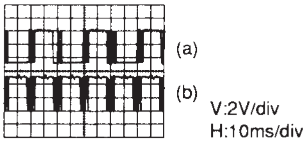
③ ICK01,Pin ⑲ D-7



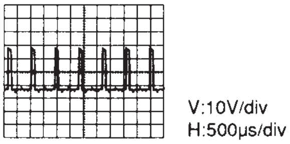
④ ICK01

(a) Pin ⑳ (DATA IN) C-7

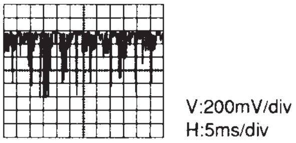
(b) Pin ㉑ (DATA OUT) C-7



⑤ ICK01,Pin ㊸ C-5

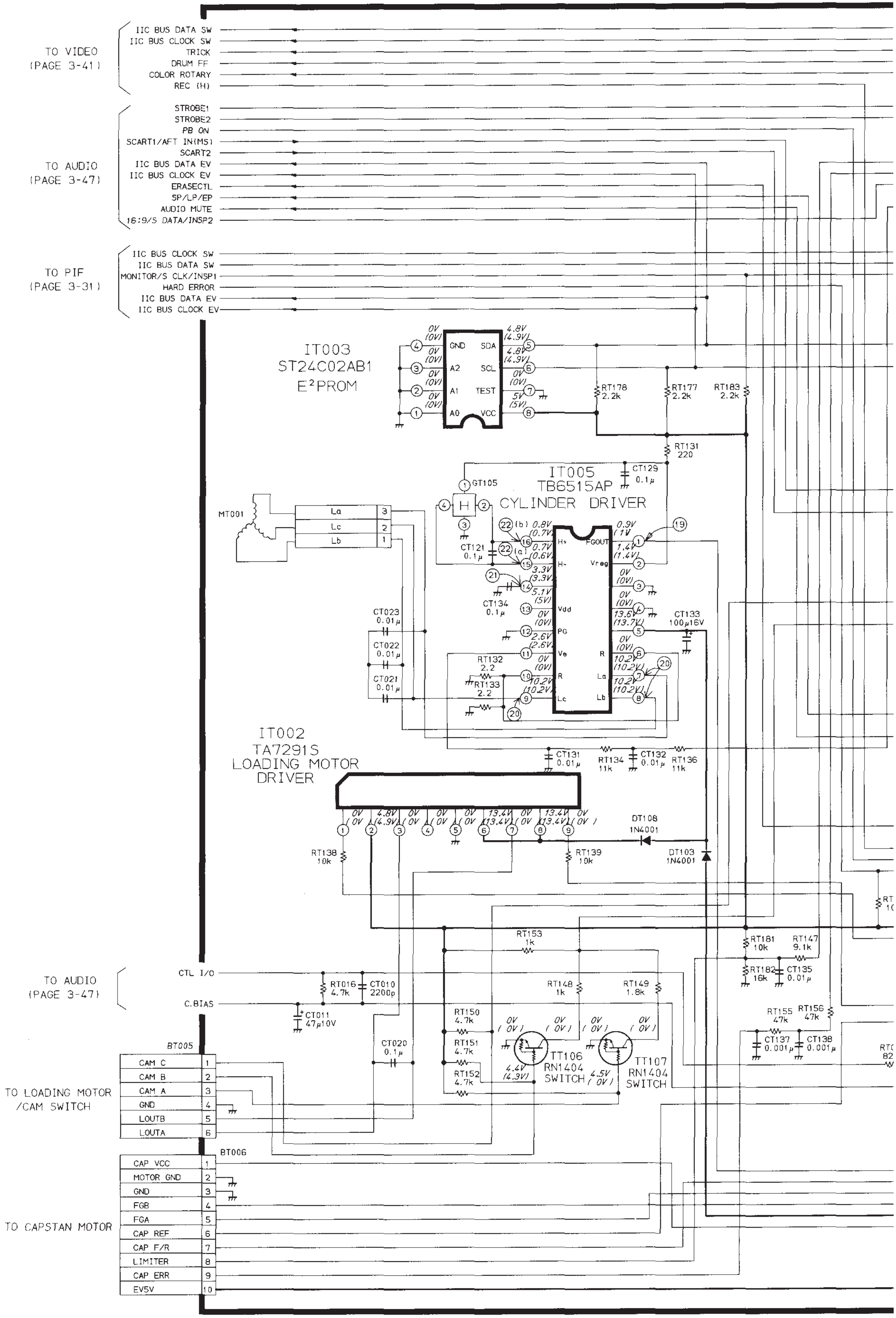


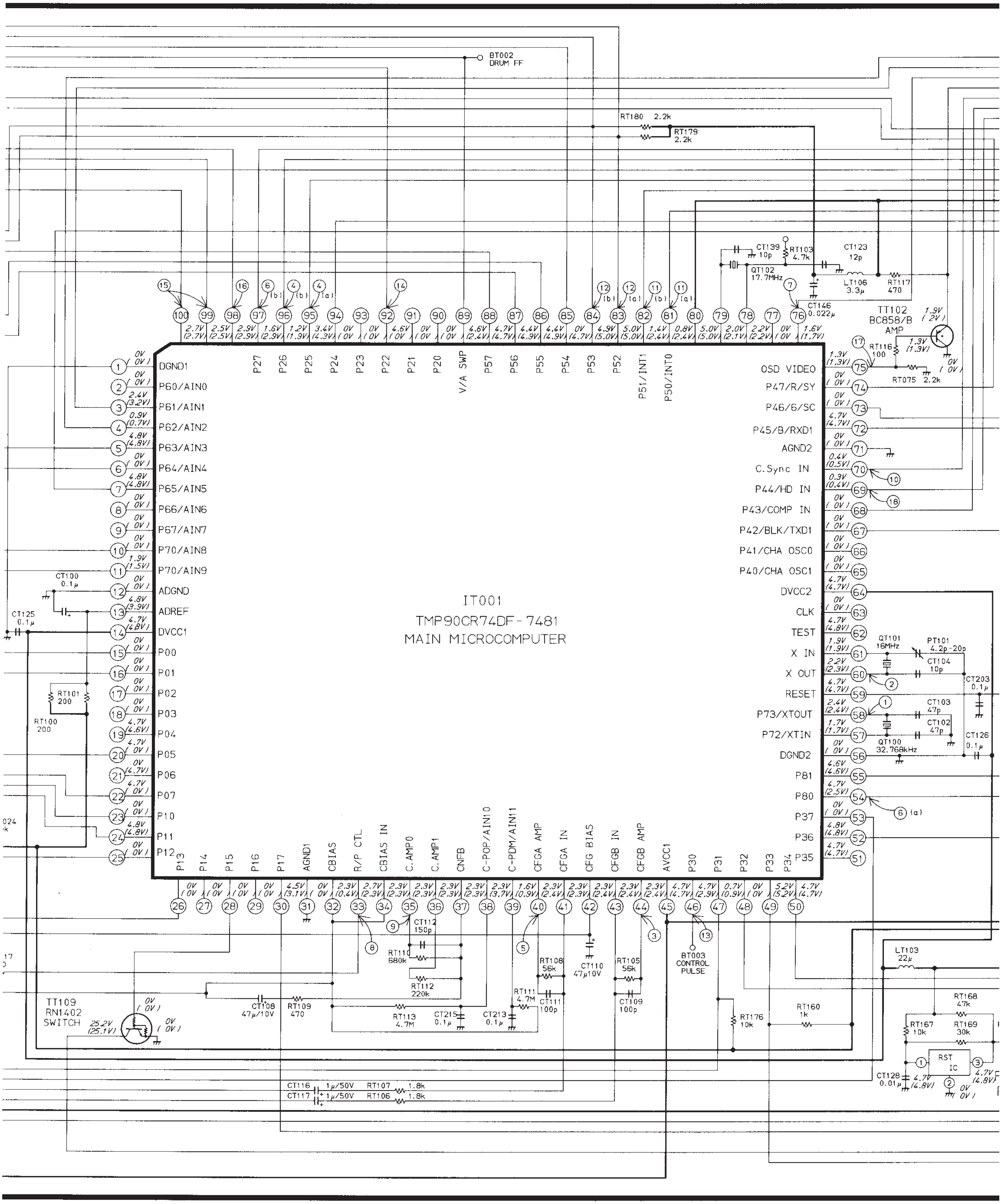
⑥ ICK01,Pin ㊼,㊽ E-6

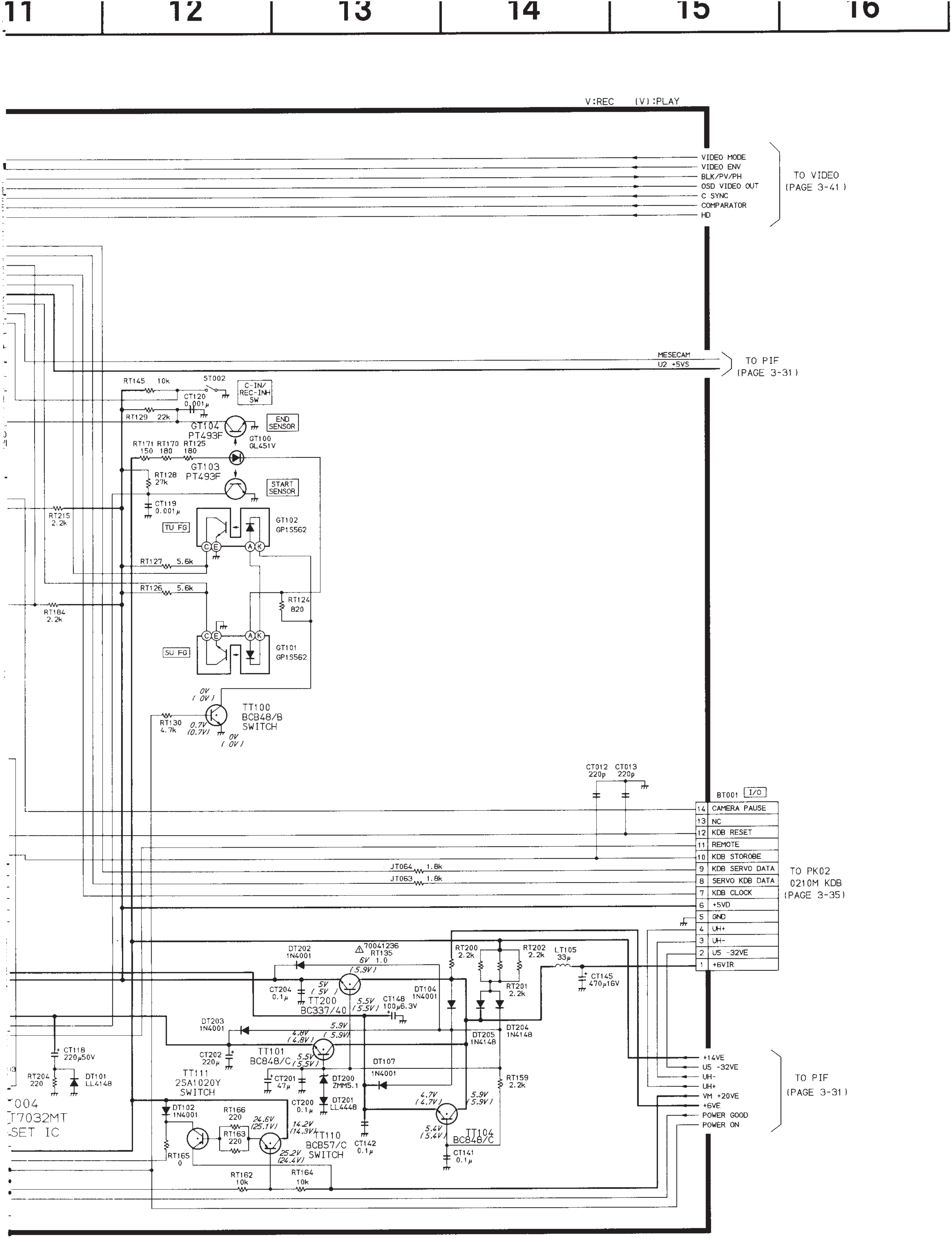


8-4. SERVO/LOGIC CIRCUIT DIAGRAM

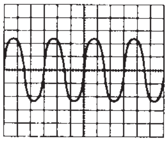
0005M MAIN(SERVO/LOGIC)


TO VIDEO (PAGE 3-41)
IIC BUS DATA SW
IIC BUS CLOCK SW
TRICK
DRUM FF
COLOR ROTARY
REC (H)
TO AUDIO (PAGE 3-47)
STROBE1
STROBE2
PB ON
SCART1/AFT IN(MS)
SCART2
IIC BUS DATA EV
IIC BUS CLOCK EV
ERASECTL
SP/LP/EP
AUDIO MUTE
16:9/S DATA/INSP2
TO PIF (PAGE 3-31)
IIC BUS CLOCK SW
IIC BUS DATA SW
MONITOR/S CLK/INSP1
HARD ERROR
IIC BUS DATA EV
IIC BUS CLOCK EV
IT003
ST24C02AB1
E²PROM
GND
A2
A1
A0
SDA
SCL
TEST
VCC
RT178 2.2k
RT177 2.2k
RT183 2.2k
RT131 220
IT005
TB6515AP
CYLINDER DRIVER
CT129 0.1μ
GT105
MT001
La
Lc
Lb
CT121 0.1μ
CT134 0.1μ
CT133 100μ16V
CT023 0.01μ
CT022 0.01μ
CT021 0.01μ
RT132 2.2
RT133 2.2
H+
H-
Vdd
PG
Ve
R
Lc
FGOUT
Vreg
La
Lb
IT002
TA7291S
LOADING MOTOR DRIVER
CT131 0.01μ
RT134 11k
CT132 0.01μ
RT136 11k
DT108 1N4001
DT103 1N4001
RT138 10k
RT139 10k
RT153 1k
RT148 1k
RT149 1.8k
RT150 4.7k
RT151 4.7k
RT152 4.7k
TT106 RN1404 SWITCH
TT107 RN1404 SWITCH
CT020 0.1μ
RT181 10k
RT147 9.1k
RT182 16k
CT135 0.01μ
RT155 47k
RT156 47k
CT137 0.001μ
CT138 0.001μ
TO AUDIO (PAGE 3-47)
CTL I/O
C.BIAS
RT016 4.7k
CT010 2200p
CT011 47μ10V
BT005
TO LOADING MOTOR /CAM SWITCH
CAM C
CAM B
CAM A
GND
LOUTB
LOUTA
BT006
TO CAPSTAN MOTOR
CAP VCC
MOTOR GND
GND
FGB
FGA
CAP REF
CAP F/R
LIMITER
CAP ERR
EV5V


IT001
TMP90CR74DF-7481
MAIN MICROCOMPUTER
BT002 DRUM FF
RT180 2.2k
RT179 2.2k
CT139 10p
RT103 4.7k
CT123 12p
QT102 17.7MHz
LT106 3.3μ
RT117 470
CT146 0.022μ
TT102 BC858/B AMP
RT116 100
RT075 2.2k
1.9V (2V)
1.3V (1.3V)
DGND1
P60/AIN0
P61/AIN1
P62/AIN2
P63/AIN3
P64/AIN4
P65/AIN5
P66/AIN6
P67/AIN7
P70/AIN8
P70/AIN9
ADGND
ADREF
DVCC1
P00
P01
P02
P03
P04
P05
P06
P07
P10
P11
P12
P27
P26
P25
P24
P23
P22
P21
P20
V/A SWP
P57
P56
P55
P54
P53
P52
P51/INT1
P50/INT0
OSD VIDEO
P47/R/SY
P46/6/SC
P45/B/RXD1
AGND2
C.Sync IN
P44/HD IN
P43/COMP IN
P42/BLK/TXD1
P41/CHA OSC0
P40/CHA OSC1
DVCC2
CLK
TEST
X IN
X OUT
RESET
P73/XTOUT
P72/XTIN
DGND2
P81
P80
P37
P36
P35
P13
P14
P15
P16
P17
AGND1
CBIAS
R/P CTL
CBIAS IN
C.AMP0
C.AMP1
CNFB
C-POP/AIN10
C-PDM/AIN11
CFGA AMP
CFGA IN
CFG BIAS
CFGB IN
CFGB AMP
AVCC1
P30
P31
P32
P33
P34
CT100 0.1μ
CT125 0.1μ
RT101 200
RT100 200
QT101 16MHz
PT101 4.2p-20p
CT104 10p
CT203 0.1μ
CT103 47p
CT102 47p
QT100 32.768kHz
CT126 0.1μ
CT112 150p
RT110 680k
RT112 220k
RT108 56k
CT110 47μ10V
RT105 56k
CT109 100p
RT111 4.7M
CT111 100p
CT108 47μ/10V
RT109 470
RT113 4.7M
CT215 0.1μ
CT213 0.1μ
BT003 CONTROL PULSE
LT103 22μ
RT168 47k
RT167 10k
RT169 30k
RT160 1k
RT176 10k
RST IC
CT128 0.01μ
4.7V (4.8V)
TT109 RN1402 SWITCH
25.2V (25.1V)
0V (0V)
CT116 1μ/50V
CT117 1μ/50V
RT107 1.8k
RT106 1.8k
024
17


11
12
13
14
15
16
V:REC (V):PLAY
VIDEO MODE
VIDEO ENV
BLK/PV/PH
OSD VIDEO OUT
C SYNC
COMPARATOR
HD
TO VIDEO (PAGE 3-41)
MESECAM
U2 +5VS
TO PIF (PAGE 3-31)
RT145 10k
ST002
C-IN/ REC-INH SW
CT120 0.001μ
RT129 22k
GT104 PT493F
END SENSOR
GT100 GL451V
RT171 150
RT170 180
RT125 180
GT103 PT493F
RT128 27k
START SENSOR
CT119 0.001μ
RT215 2.2k
TU FG
GT102 GP1S562
C E A K
RT127 5.6k
RT126 5.6k
RT124 820
RT184 2.2k
SU FG
GT101 GP1S562
0V (0V)
TT100 BCB48/B SWITCH
RT130 4.7k
0.7V (0.7V)
0V (0V)
CT012 220p
CT013 220p
BT001 I/O
14 CAMERA PAUSE
13 NC
12 KDB RESET
11 REMOTE
10 KDB STOROBE
9 KDB SERVO DATA
8 SERVO KDB DATA
7 KDB CLOCK
6 +5VD
5 GND
4 UH+
3 UH-
2 U5 -32VE
1 +6VIR
JT064 1.8k
JT063 1.8k
TO PK02 0210M KDB (PAGE 3-35)
DT202 1N4001
70041236 RT135 6V 1.0
(5.9V)
CT204 0.1μ
5V (5V)
TT200 BC337/40
5.5V (5.5V)
CT148 100μ6.3V
DT104 1N4001
RT200 2.2k
RT202 2.2k
LT105 33μ
CT145 470μ16V
RT201 2.2k
DT204 1N4148
DT205 1N4148
DT203 1N4001
4.8V (4.8V)
5.9V (5.9V)
5.5V (5.5V)
TT101 BC848/C
CT202 220μ
CT118 220μ50V
RT204 220
DT101 LL4148
TT111 25A1020Y SWITCH
CT201 47μ
DT200 ZMM5.1
DT107 1N4001
RT159 2.2k
CT200 0.1μ
DT201 LL4448
4.7V (4.7V)
5.9V (5.9V)
5.4V (5.4V)
TT104 BC848/C
CT141 0.1μ
CT142 0.1μ
DT102 1N4001
RT166 220
RT163 220
24.6V (25.1V)
14.2V (14.3V)
TT110 BCB57/C SWITCH
25.2V (24.4V)
RT165 0
RT162 10k
RT164 10k
+14VE
U5 -32VE
UH-
UH+
VM +20VE
+6VE
POWER GOOD
POWER ON
TO PIF (PAGE 3-31)
T004
T7032MT
SET IC

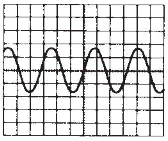
① IT001, Pin (58) E-10



XT-OUT

V:1V/div
H:10μs/div

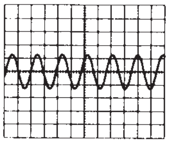
② IT001,Pin (60) E-10



X–OUT

V:1V/div
H:0.02μs/div

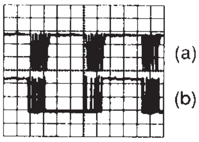
③ IT001, Pin ㊹ F-9



CPGB.AMP

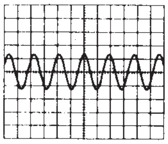
V:500mV/div
H:500μs/div

④ IT001
(a) Pin (95) (SCLK0) B-7
(b) Pin (96) (SDA OUT) B-7



V:2V/div
H:5ms/div

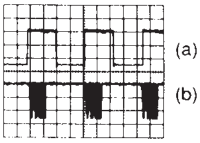
⑤ IT001, Pin ㊵ F-8



CPGA.AMP

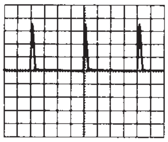
V:200mV/div
H:500μs/div

⑥ IT001
(a) Pin (54) (STB) E-10
(b) Pin (97) (SDA IN) B-7



V:2V/div
H:5ms/div

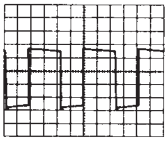
⑦ IT001, Pin (76) B-10



PV/PH/BLK
STILL

V:1V/div
H:5ms/div

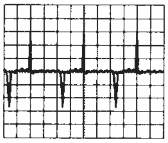
⑧ IT001, Pin ㉝ F-7



R/P CTL
(REC)

V:1V/div
H:10ms/div

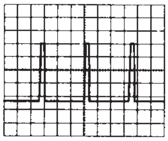
⑨ IT001, Pin ㉟ F-7



C AMP0 (SP)

V:500mV/div
H:10ms/div

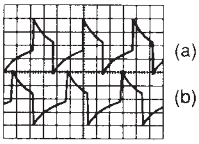
⑩ IT001, Pin (70) C-10



CSYNC

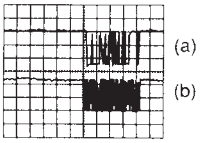
V:1V/div
H:20μs/div

⑪ IT001
(a) Pin (81) (SU FG) B-9
(b) Pin (82) (TU FG) B-9



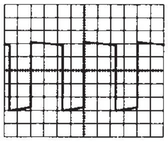
V:2V/div
H:200ms/div

⑫ IT001
(a) Pin (83) (SDA1) B-9
(b) Pin (84) (SCL1) B-9



V:2V/div
H:200μs/div

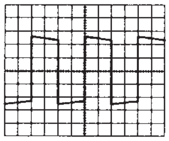
⑬ IT001, Pin ㊻ F-9



CTL OUT

V:1V/div
H:10ms/div

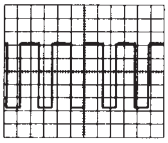
⑭ IT001, Pin (92) B-8



CR (SP)

V:1V/div
H:10ms/div

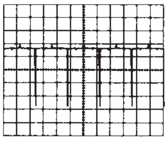
⑮ IT001, Pin (99), (100) B-6



CPWM

V:1V/div
H:10μs/div

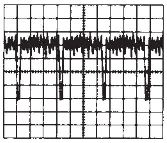
⑯ IT001, Pin (98) B-7



CAP

V:500mV/div
H:20μs/div

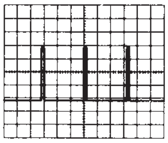
⑰ IT001, Pin (75) C-10



OSD
VIDEO

V:50mV/div
H:20μs/div

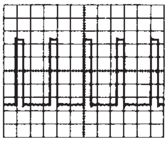
⑱ IT001, Pin (69) D-10



HD IN

V:1V/div
H:20μs/div

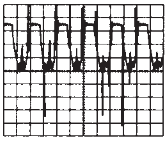
⑲ IT005, Pin ① D-4



FoOUT

V:1V/div
H:2ms/div

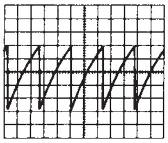
⑳ IT005,
Pin ⑦, ⑧ D-4
Pin ⑨ D-3



La, Lb, Lc

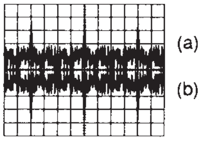
V:2V/div
H:5ms/div

㉑ IT005, Pin ⑭ D-3



V:1V/div
H:50ms/div

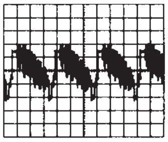
㉒ IT005
(a) Pin ⑮ (H–) D-3
(b) Pin ⑯ (H+) D-3



V:100mV/div
H:10ms/div

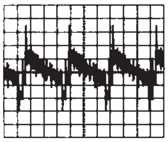
8-5. Video Circuit Diagram

① IV001, Pin ② F-6



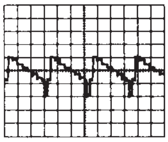
PLAY
V:500mV/div
H:20μs/div

② IV001, Pin ⑥ F-7



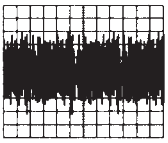
PLAY
V:100mV/div
H:20μs/div

③ IV001, Pin ⑧ F-7



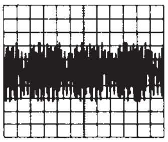
PLAY
V:100mV/div
H:20μs/div

④ IV001, Pin ⑪ F-7



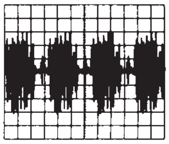
PLAY
V:75mV/div
H:20μs/div

⑤ IV001, Pin ㉗ F-10



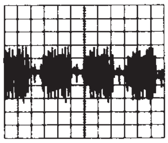
PLAY
V:50mV/div
H:20μs/div

⑥ IV001, Pin ㉛ C-9



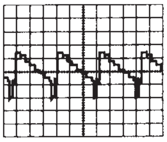
PLAY
V:75mV/div
H:20μs/div

⑦ IV001, Pin ㉝ C-9



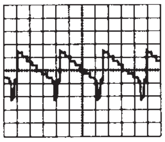
PLAY
V:100mV/div
H:20μs/div

⑧ IV001, Pin ㊻ C-7



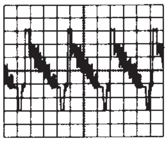
PLAY
V:100mV/div
H:20μs/div

⑨ IV001, Pin ㊼ C-7



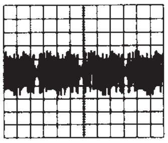
PLAY
V:200mV/div
H:20μs/div

⑩ IV001, Pin (51) C-6



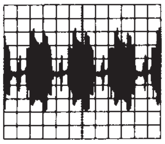
EE/REC
V:200mV/div
H:20μs/div

⑪ IV001, Pin ⑨ F-7



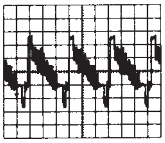
REC
V:200mV/div
H:20μs/div

⑫ IV001, Pin ㉙ C-10



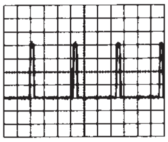
REC
V:50mV/div
H:20μs/div

⑬ IV001, Pin ㊾ C-7



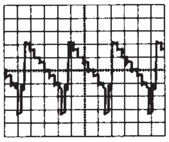
REC
V:100mV/div
H:20μs/div

⑭ IV070, Pin ③ B-6



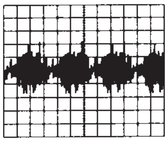
PLAY
V:1V/div
H:20μs/div

⑮ IV070, Pin ⑦ B-7



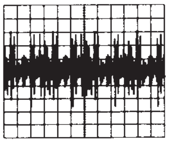
PLAY
V:100mV/div
H:20μs/div

⑯ IV100, Pin ⑥ C-13



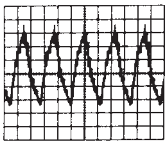
PLAY
V:100mV/div
H:20μs/div

⑰ IV100, Pin ⑥ C-13



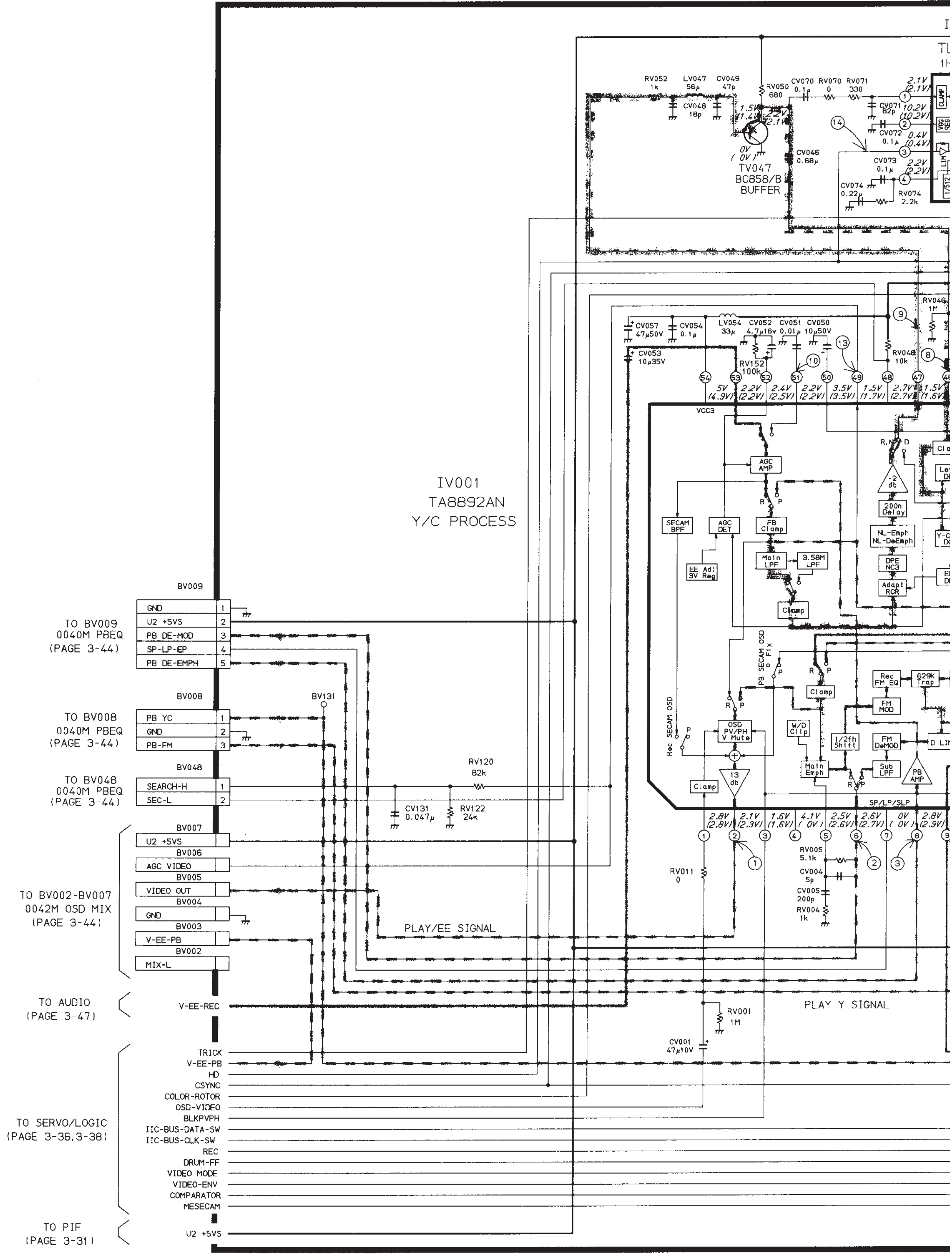
REC
V:100mV/div
H:20μs/div

⑱ IV100, Pin ⑯ D-11

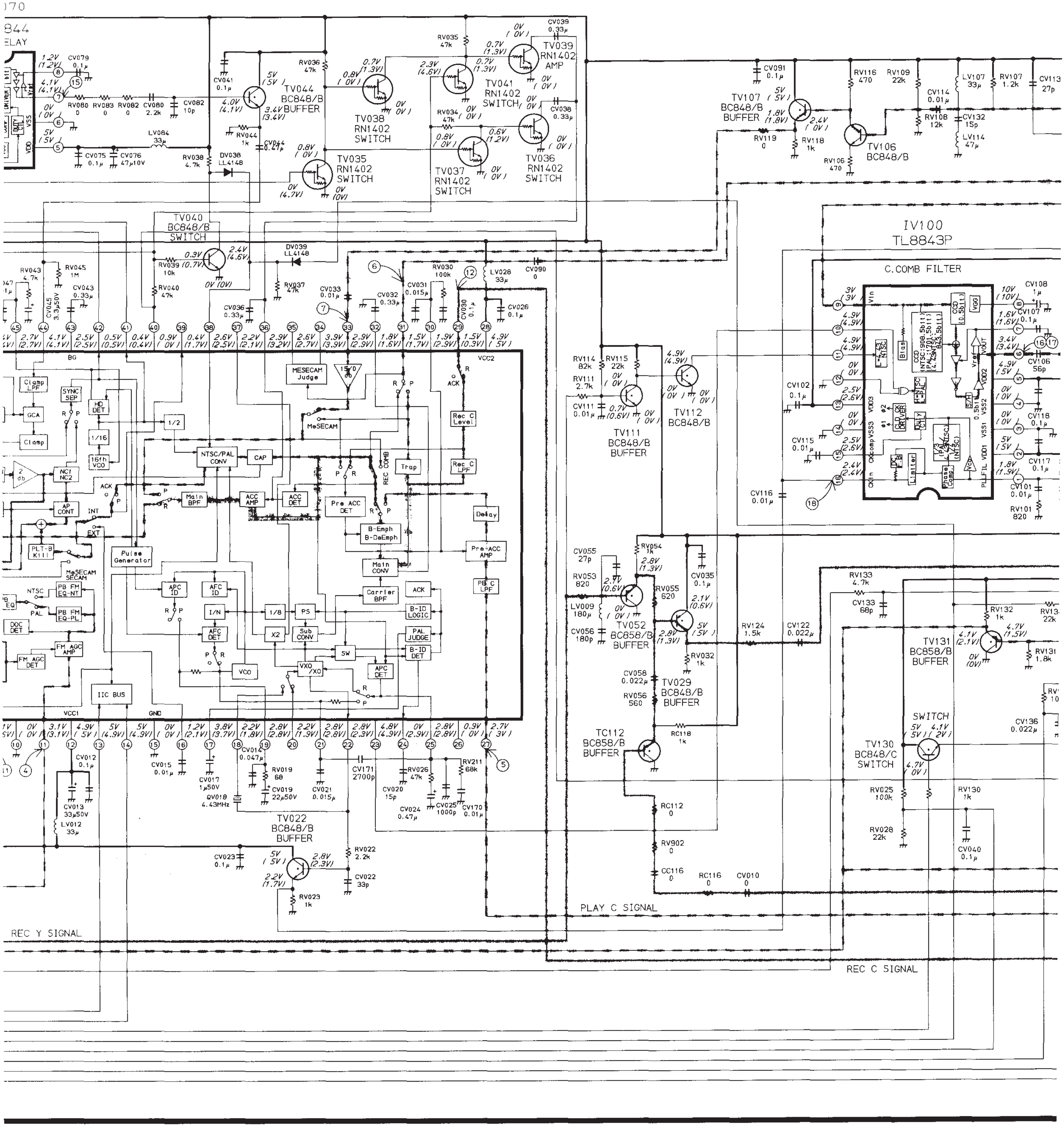


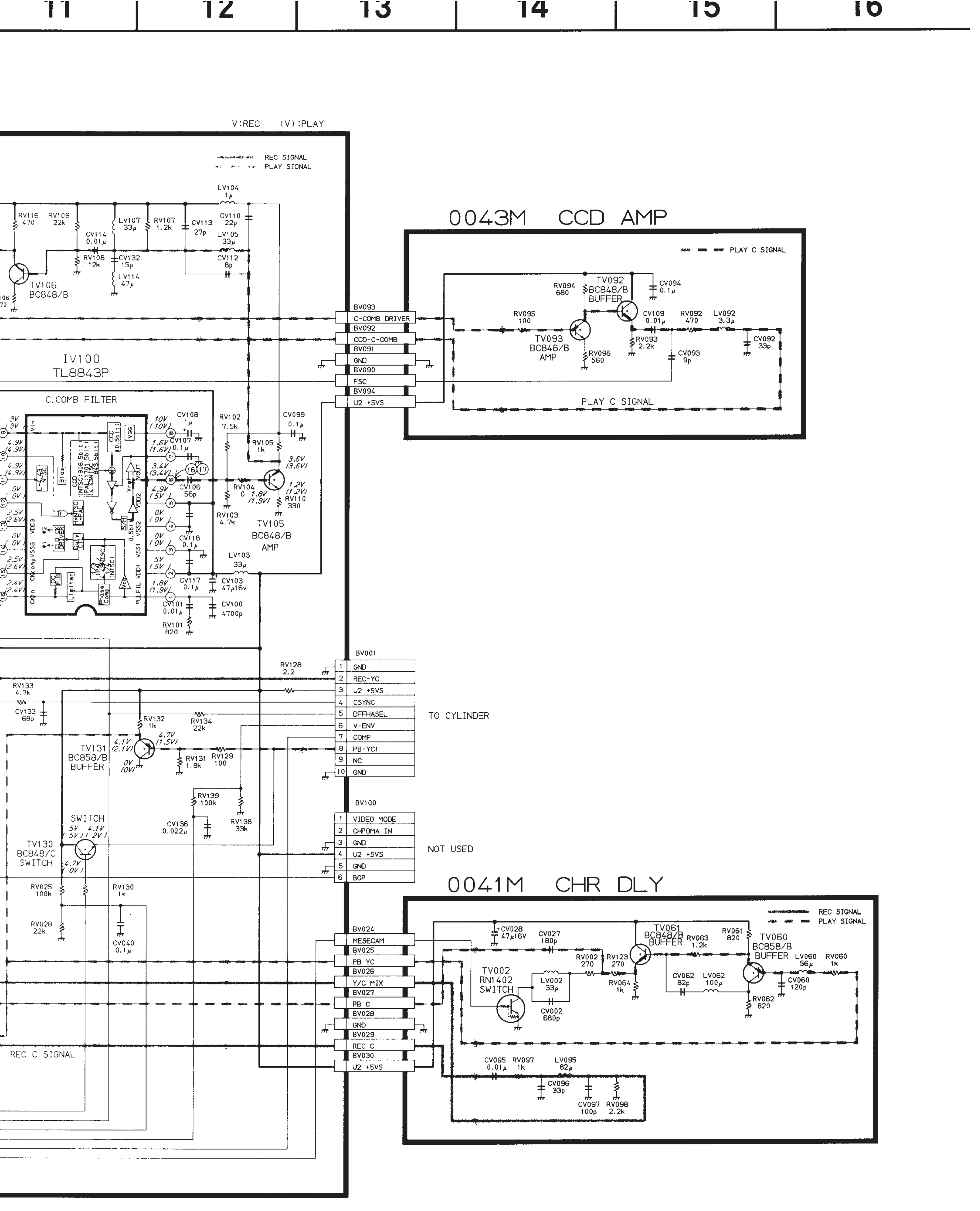
REC
V:50mV/div
H:0.1μs/div

0005M MAIN(VIDEO)

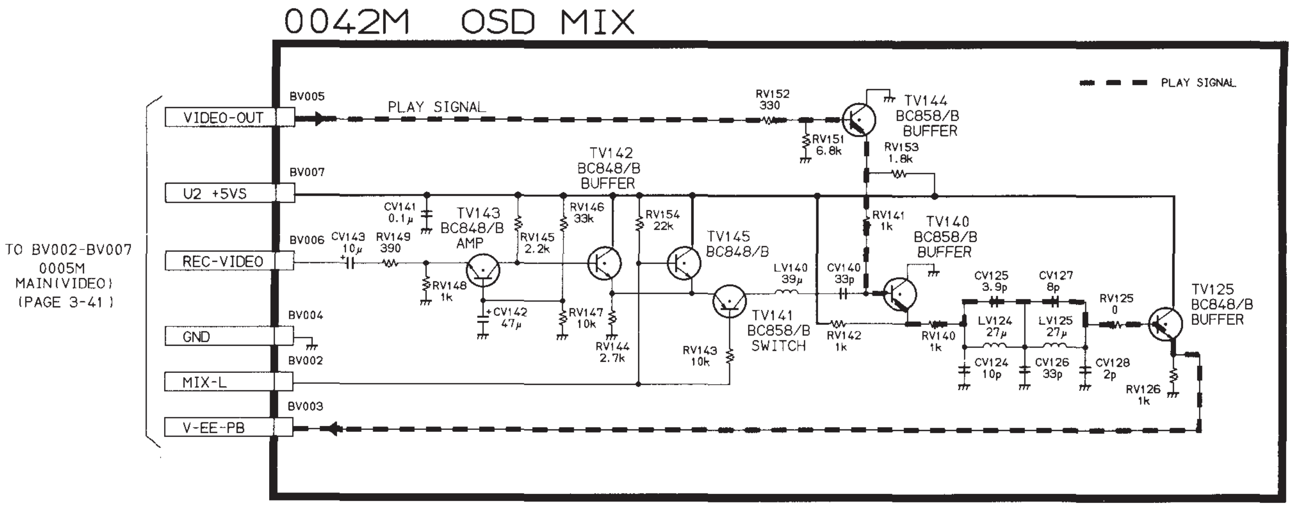


IV001
TA8892AN
Y/C PROCESS
TV047
BC858/B
BUFFER
RV052 1k
LV047 56μ
CV049 47p
CV048 18p
RV050 680
CV070 0.1μ
RV070 0
RV071 330
CV071 82p
CV072 0.1μ
CV073 0.1μ
CV046 0.68μ
CV074 0.22μ
RV074 2.2k
CV057 47μ50V
CV054 0.1μ
CV053 10μ35V
LV054 33μ
CV052 4.7μ16v
CV051 0.01μ
CV050 10μ50V
RV152 100k
RV046 1M
RV048 10k
VCC3
AGC AMP
AGC DET
SECAM BPF
EE Adj 3V Reg
FB Clamp
Main LPF
3.58M LPF
Clamp
-2 db
200n Delay
NL-Emph NL-DeEmph
DPE NC3
Adapt RCR
OSD PV/PH V Mute
13 db
W/D Clip
Main Emph
1/2fh Shift
Rec FM EQ
629K Trap
FM MOD
FM DeMOD
Sub LPF
PB AMP
SP/LP/SLP
PB SECAM OSD Fix
Rec SECAM OSD
RV005 5.1k
CV004 5p
CV005 200p
RV004 1k
RV011 0
RV001 1M
CV001 47μ10V
RV120 82k
CV131 0.047μ
RV122 24k
BV131
BV009
GND
U2 +5VS
PB DE-MOD
SP-LP-EP
PB DE-EMPH
TO BV009 0040M PBEQ (PAGE 3-44)
BV008
PB YC
GND
PB-FM
TO BV008 0040M PBEQ (PAGE 3-44)
BV048
SEARCH-H
SEC-L
TO BV048 0040M PBEQ (PAGE 3-44)
BV007
U2 +5VS
BV006
AGC VIDEO
BV005
VIDEO OUT
BV004
GND
BV003
V-EE-PB
BV002
MIX-L
TO BV002-BV007 0042M OSD MIX (PAGE 3-44)
PLAY/EE SIGNAL
PLAY Y SIGNAL
TO AUDIO (PAGE 3-47)
V-EE-REC
TRICK
V-EE-PB
HD
CSYNC
COLOR-ROTOR
OSD-VIDEO
BLKPVPH
IIC-BUS-DATA-SW
IIC-BUS-CLK-SW
REC
DRUM-FF
VIDEO MODE
VIDEO-ENV
COMPARATOR
MESECAM
TO SERVO/LOGIC (PAGE 3-36,3-38)
TO PIF (PAGE 3-31)
U2 +5VS

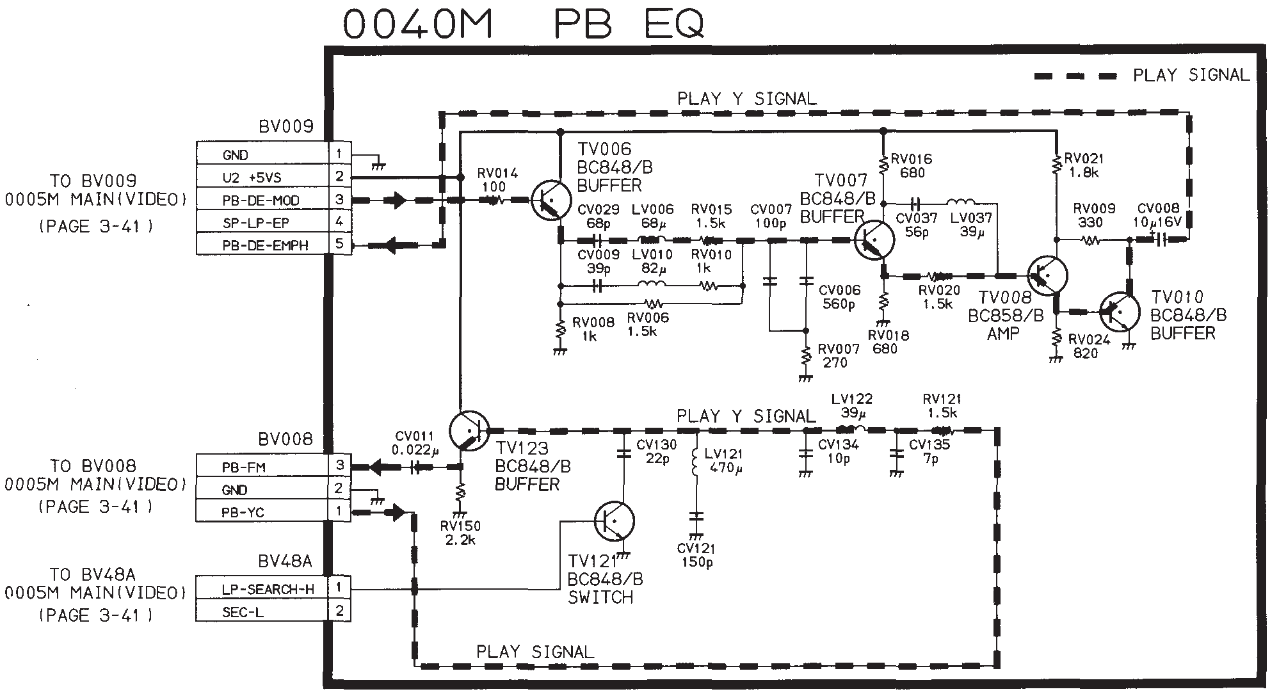

IV100
TL8843P
C.COMB FILTER
TV044
BC848/B
BUFFER
TV038
RN1402
SWITCH
TV035
RN1402
SWITCH
TV037
RN1402
SWITCH
TV041
RN1402
SWITCH
TV039
RN1402
AMP
TV036
RN1402
SWITCH
TV040
BC848/B
SWITCH
TV107
BC848/B
BUFFER
TV106
BC848/B
TV111
BC848/B
BUFFER
TV112
BC848/B
TV052
BC858/B
BUFFER
TV029
BC848/B
BUFFER
TC112
BC858/B
BUFFER
TV022
BC848/B
BUFFER
TV131
BC858/B
BUFFER
TV130
BC848/C
SWITCH
DV038
LL4148
DV039
LL4148
QV018
4.43MHz
Clamp LPF
GCA
Clamp
SYNC SEP
HD DET
1/16
16fh VCO
1/2
NTSC/PAL CONV
CAP
MESECAM Judge
MeSECAM
Rec C Level
Trap
Rec C LPF
REC COMB
Main BPF
ACC AMP
ACC DET
Pre ACC DET
B-Emph B-DeEmph
Main CONV
Delay
Pre-ACC AMP
PB C LPF
Carrier BPF
ACK
B-ID LOGIC
PAL JUDGE
B-ID DET
APC ID
AFC ID
I/N
1/8
PS
AFC DET
X2
Sub CONV
SW
VXO /XO
APC DET
VCO
IIC BUS
Pulse Generator
PLT-B Kill
AP CONT
NC1 NC2
2 db
MeSECAM SECAM
PB FM EQ-NT
PB FM EQ-PL
FM AGC AMP
FM AGC DET
DOC DET
NTSC
PAL
INT
EXT
BG
VCC1
VCC2
GND
Vin
VDD3
VSS3
CKcomp
CKin
PLFIL
VDD1
VSS1
VSS2
VDD2
VOUT
Vref
CCD
Bias
Limiter
Phase Comp.
Duty
CLK DRIVER
SWITCH
PLAY C SIGNAL
REC C SIGNAL
REC Y SIGNAL


11
12
13
14
15
16
V:REC (V):PLAY
REC SIGNAL
PLAY SIGNAL
0043M CCD AMP
PLAY C SIGNAL
TV092 BC848/B BUFFER
TV093 BC848/B AMP
RV094 680
CV094 0.1μ
RV095 100
CV109 0.01μ
RV092 470
LV092 3.3μ
RV093 2.2k
CV092 33p
CV093 9p
RV096 560
PLAY C SIGNAL
BV093 C-COMB DRIVER
BV092 CCD-C-COMB
BV091 GND
BV090 FSC
BV094 U2 +5VS
IV100 TL8843P
C.COMB FILTER
LV104 1μ
RV116 470
RV109 22k
CV114 0.01μ
LV107 33μ
RV107 1.2k
CV113 27p
CV110 22p
LV105 33μ
RV108 12k
CV132 15p
CV112 8p
LV114 47μ
TV106 BC848/B
CV108 1μ
CV107 0.1μ
CV106 56p
CV118 0.1μ
CV117 0.1μ
CV103 47μ16v
CV101 0.01μ
CV100 4700p
RV101 820
RV102 7.5k
RV105 1k
CV099 0.1μ
RV104 0
RV110 330
RV103 4.7k
TV105 BC848/B AMP
LV103 33μ
BV001
1 GND
2 REC-YC
3 U2 +5VS
4 CSYNC
5 DFFHASEL
6 V-ENV
7 COMP
8 PB-YC1
9 NC
10 GND
TO CYLINDER
RV128 2.2
RV133 4.7k
CV133 68p
RV132 1k
RV134 22k
TV131 BC858/B BUFFER
RV131 1.8k
RV129 100
RV139 100k
RV138 33k
CV136 0.022μ
BV100
1 VIDEO MODE
2 CHPOMA IN
3 GND
4 U2 +5VS
5 GND
6 BGP
NOT USED
SWITCH
TV130 BC848/C SWITCH
RV025 100k
RV130 1k
RV028 22k
CV040 0.1μ
REC C SIGNAL
0041M CHR DLY
REC SIGNAL
PLAY SIGNAL
BV024 MESECAM
BV025 PB YC
BV026 Y/C MIX
BV027 PB C
BV028 GND
BV029 REC C
BV030 U2 +5VS
CV028 47μ16V
CV027 180p
TV061 BC848/B BUFFER
RV063 1.2k
RV061 820
TV060 BC858/B BUFFER
RV002 270
RV123 270
TV002 RN1402 SWITCH
LV002 33μ
CV002 680p
RV064 1k
CV062 82p
LV062 100μ
LV060 56μ
RV060 1k
CV060 120p
RV062 820
CV095 0.01μ
RV097 1k
LV095 82μ
CV096 33p
CV097 100p
RV098 2.2k

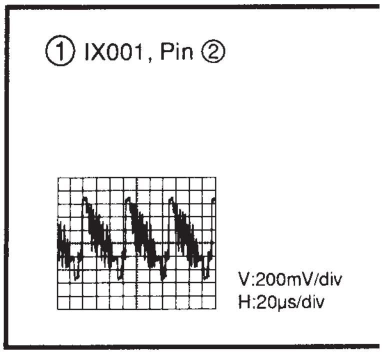
8-6. OSD MIX Circuit Diagram

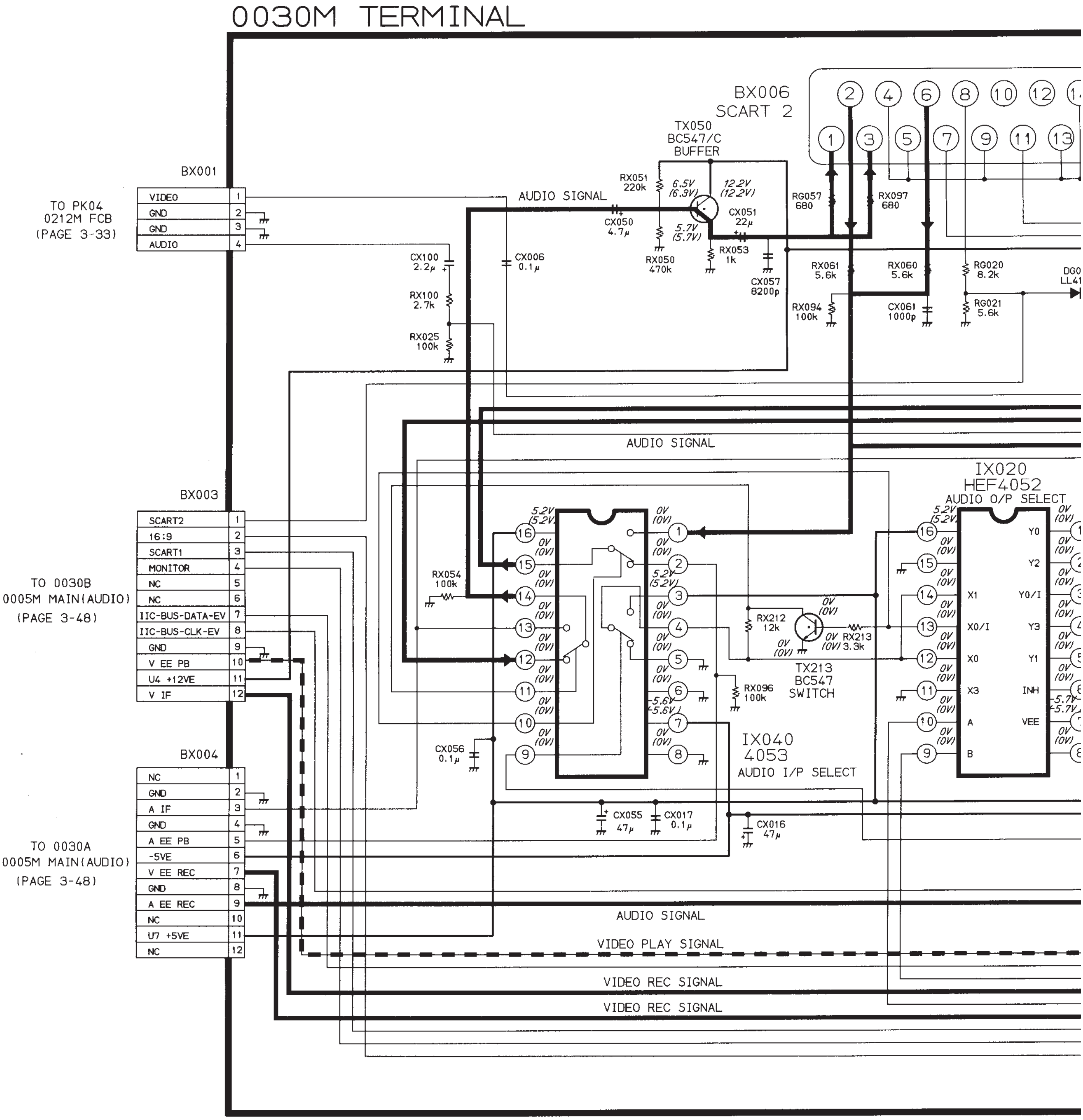

0042M OSD MIX
PLAY SIGNAL
TO BV002-BV007
0005M
MAIN(VIDEO)
(PAGE 3-41)
VIDEO-OUT
U2 +5VS
REC-VIDEO
GND
MIX-L
V-EE-PB
BV005
BV007
BV006
BV004
BV002
BV003
PLAY SIGNAL
RV152 330
RV151 6.8k
TV144 BC858/B BUFFER
RV153 1.8k
TV142 BC848/B BUFFER
CV141 0.1μ
TV143 BC848/B AMP
RV146 33k
RV154 22k
RV145 2.2k
CV143 10μ
RV149 390
RV148 1k
CV142 47μ
RV147 10k
RV144 2.7k
TV145 BC848/B
TV141 BC858/B SWITCH
RV143 10k
LV140 39μ
CV140 33p
RV141 1k
TV140 BC858/B BUFFER
RV142 1k
RV140 1k
CV125 3.9p
CV127 8p
LV124 27μ
LV125 27μ
CV124 10p
CV126 33p
CV128 2p
RV125 0
TV125 BC848/B BUFFER
RV126 1k

8-7. PB EQ Circuit Diagram

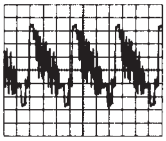

0040M PB EQ
PLAY SIGNAL
PLAY Y SIGNAL
BV009
TO BV009
0005M MAIN(VIDEO)
(PAGE 3-41)
GND 1
U2 +5VS 2
PB-DE-MOD 3
SP-LP-EP 4
PB-DE-EMPH 5
RV014 100
TV006 BC848/B BUFFER
CV029 68p
LV006 68μ
RV015 1.5k
CV007 100p
CV009 39p
LV010 82μ
RV010 1k
RV008 1k
RV006 1.5k
CV006 560p
RV007 270
RV016 680
TV007 BC848/B BUFFER
CV037 56p
LV037 39μ
RV018 680
RV020 1.5k
TV008 BC858/B AMP
RV021 1.8k
RV009 330
CV008 10μ16V
RV024 820
TV010 BC848/B BUFFER
BV008
TO BV008
0005M MAIN(VIDEO)
(PAGE 3-41)
PB-FM 3
GND 2
PB-YC 1
CV011 0.022μ
RV150 2.2k
TV123 BC848/B BUFFER
PLAY Y SIGNAL
CV130 22p
LV121 470μ
CV121 150p
LV122 39μ
CV134 10p
RV121 1.5k
CV135 7p
TV121 BC848/B SWITCH
BV48A
TO BV48A
0005M MAIN(VIDEO)
(PAGE 3-41)
LP-SEARCH-H 1
SEC-L 2
PLAY SIGNAL

8-8. Terminal Circuit Diagram



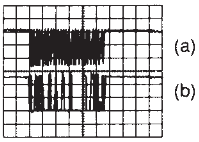

0030M TERMINAL
BX006
SCART 2
TX050
BC547/C
BUFFER
BX001
VIDEO
GND
GND
AUDIO
TO PK04
0212M FCB
(PAGE 3-33)
AUDIO SIGNAL
RX051 220k
CX050 4.7µ
RX050 470k
CX051 22µ
RX053 1k
CX057 8200p
RG057 680
RX097 680
RX061 5.6k
RX060 5.6k
RX094 100k
CX061 1000p
RG020 8.2k
RG021 5.6k
CX100 2.2µ
CX006 0.1µ
RX100 2.7k
RX025 100k
AUDIO SIGNAL
BX003
SCART2
16:9
SCART1
MONITOR
NC
NC
IIC-BUS-DATA-EV
IIC-BUS-CLK-EV
GND
V EE PB
U4 +12VE
V IF
TO 0030B
0005M MAIN(AUDIO)
(PAGE 3-48)
RX054 100k
CX056 0.1µ
IX040
4053
AUDIO I/P SELECT
RX212 12k
RX213 3.3k
TX213
BC547
SWITCH
RX096 100k
IX020
HEF4052
AUDIO O/P SELECT
X1
X0/I
X0
X3
A
B
Y0
Y2
Y0/I
Y3
Y1
INH
VEE
CX055 47µ
CX017 0.1µ
CX016 47µ
BX004
NC
GND
A IF
GND
A EE PB
-5VE
V EE REC
GND
A EE REC
NC
U7 +5VE
NC
TO 0030A
0005M MAIN(AUDIO)
(PAGE 3-48)
AUDIO SIGNAL
VIDEO PLAY SIGNAL
VIDEO REC SIGNAL
VIDEO REC SIGNAL

① IX001, Pin ② E-14



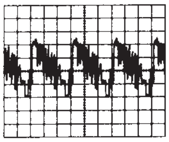
V:200mV/div
H:20μs/div

② IX001
(a) Pin ⑪ (SCL) G-13
(b) Pin ⑨ (SDA) F-14



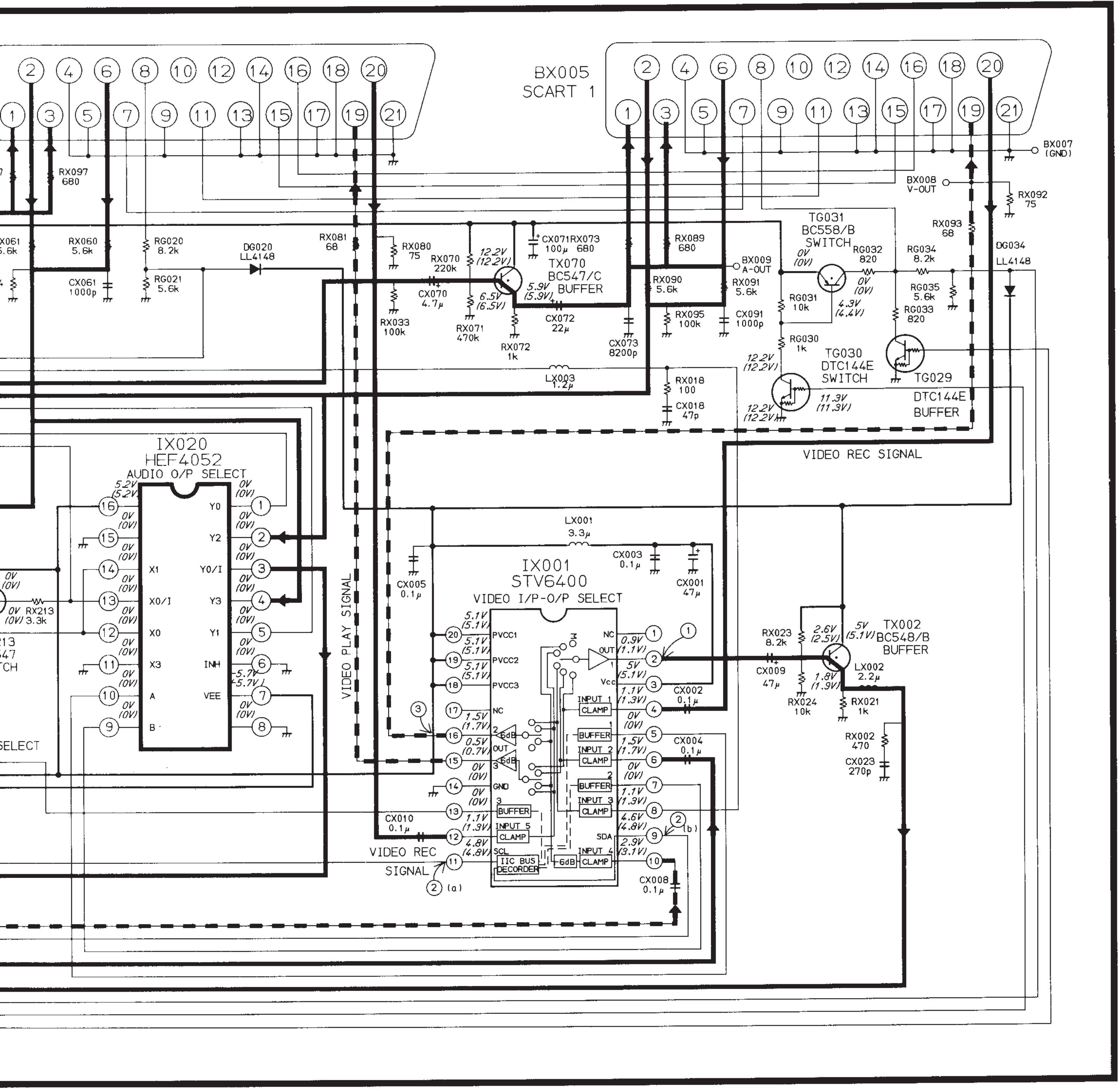
V:2V/div
H:200μs/div

③ IX001, Pin ⑯ F-13

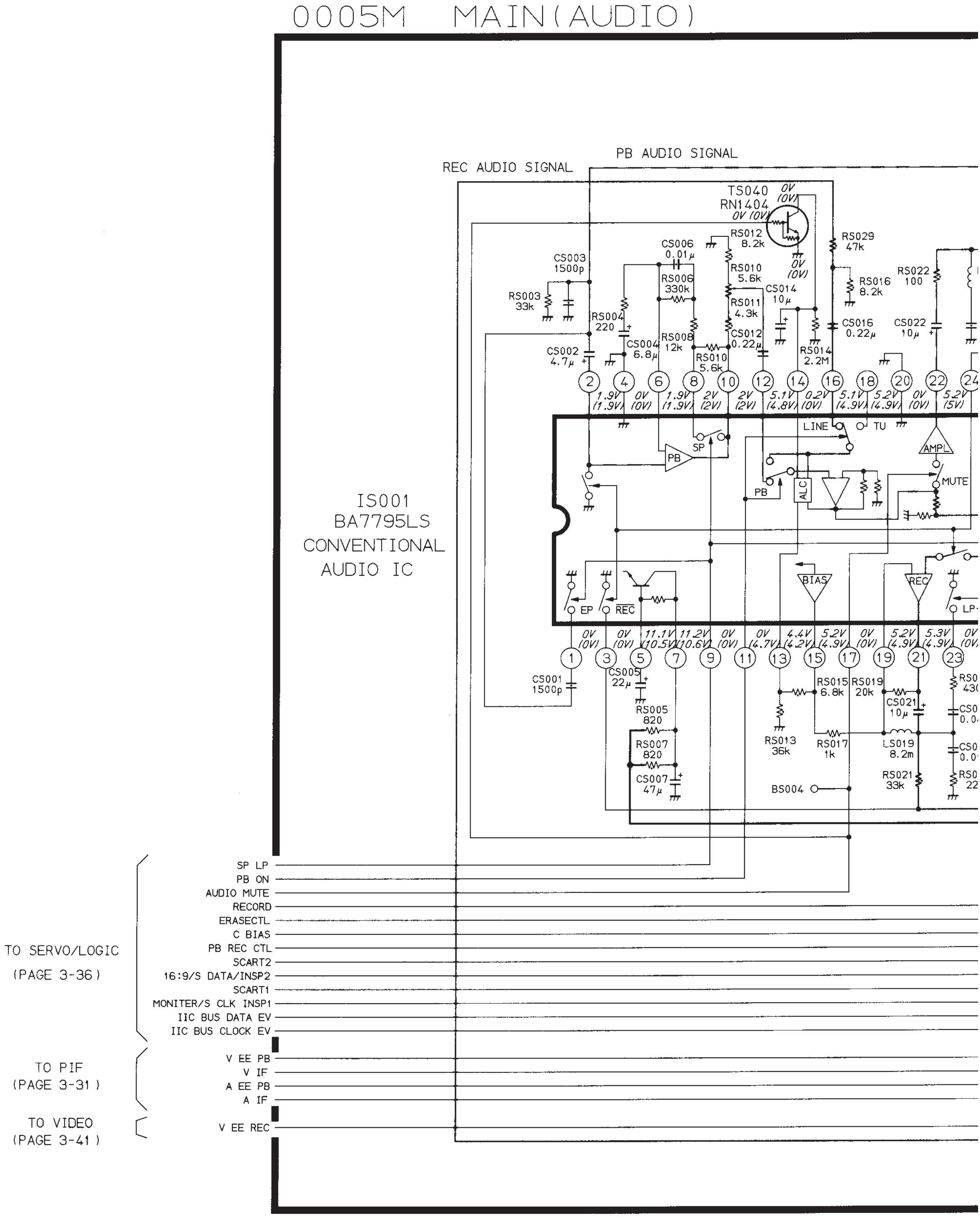


V:500mV/div
H:20μs/div

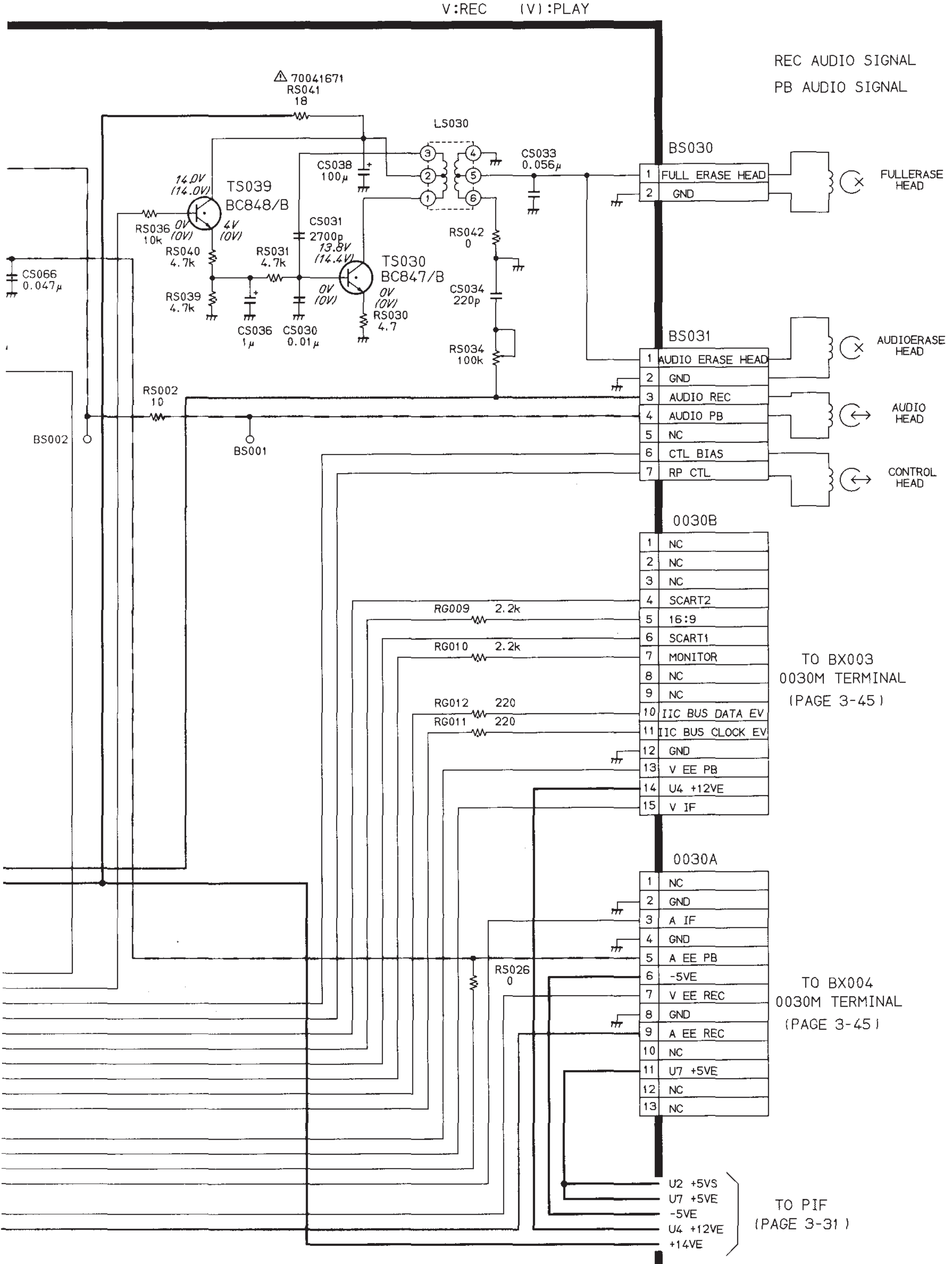
V:REC (V):PLAY


BX005
SCART 1
BX007 (GND)
BX008 V-OUT
BX009 A-OUT
RX092 75
RX093 68
RX097 680
RX061 5.6k
RX060 5.6k
CX061 1000p
RG020 8.2k
RG021 5.6k
DG020 LL4148
RX081 68
RX080 75
RX033 100k
RX070 220k
CX070 4.7μ
RX071 470k
12.2V (12.2V)
6.5V (6.5V)
5.9V (5.9V)
CX071 100μ
RX073 680
TX070 BC547/C BUFFER
CX072 22μ
RX072 1k
CX073 8200p
LX003 1.2μ
RX089 680
RX090 5.6k
RX091 5.6k
RX095 100k
CX091 1000p
RX018 100
CX018 47p
TG031 BC558/B SWITCH
RG032 820
RG031 10k
RG030 1k
RG034 8.2k
RG035 5.6k
RG033 820
0V (0V)
4.3V (4.4V)
TG030 DTC144E SWITCH
TG029 DTC144E BUFFER
11.3V (11.3V)
DG034 LL4148
VIDEO REC SIGNAL
VIDEO PLAY SIGNAL
IX020 HEF4052 AUDIO O/P SELECT
Y0 Y2 Y0/I Y3 Y1 INH VEE X1 X0/I X0 X3 A B
5.2V (5.2V)
-5.7V (-5.7V)
RX213 3.3k
SELECT
LX001 3.3μ
CX003 0.1μ
CX001 47μ
CX005 0.1μ
IX001 STV6400 VIDEO I/P-O/P SELECT
PVCC1 PVCC2 PVCC3 NC OUT GND SCL SDA Vcc
INPUT 1 CLAMP
BUFFER
INPUT 2 CLAMP
INPUT 3 CLAMP
INPUT 4 CLAMP
INPUT 5 CLAMP
IIC BUS DECORDER
6dB
CX002 0.1μ
CX004 0.1μ
CX008 0.1μ
CX010 0.1μ
VIDEO REC SIGNAL
② (a)
② (b)
5.1V (5.1V)
1.5V (1.7V)
0.5V (0.7V)
1.1V (1.3V)
4.8V (4.8V)
0.9V (1.1V)
5V (5.1V)
2.9V (3.1V)
4.6V (4.8V)
RX023 8.2k
CX009 47μ
RX024 10k
2.6V (2.5V)
5V (5.1V)
1.8V (1.9V)
TX002 BC548/B BUFFER
LX002 2.2μ
RX021 1k
RX002 470
CX023 270p

8-9. AUDIO CIRCUIT DIAGRAM

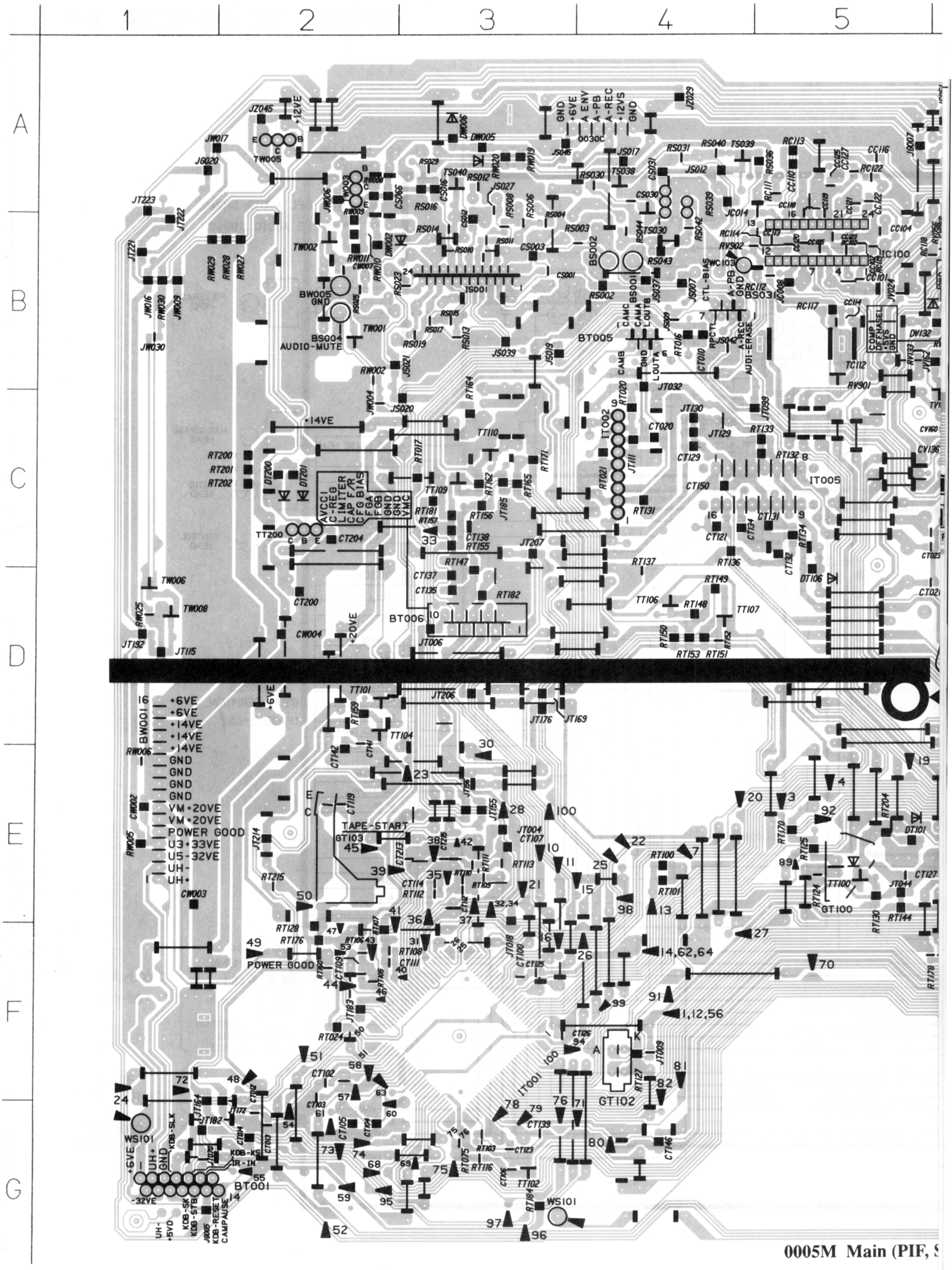


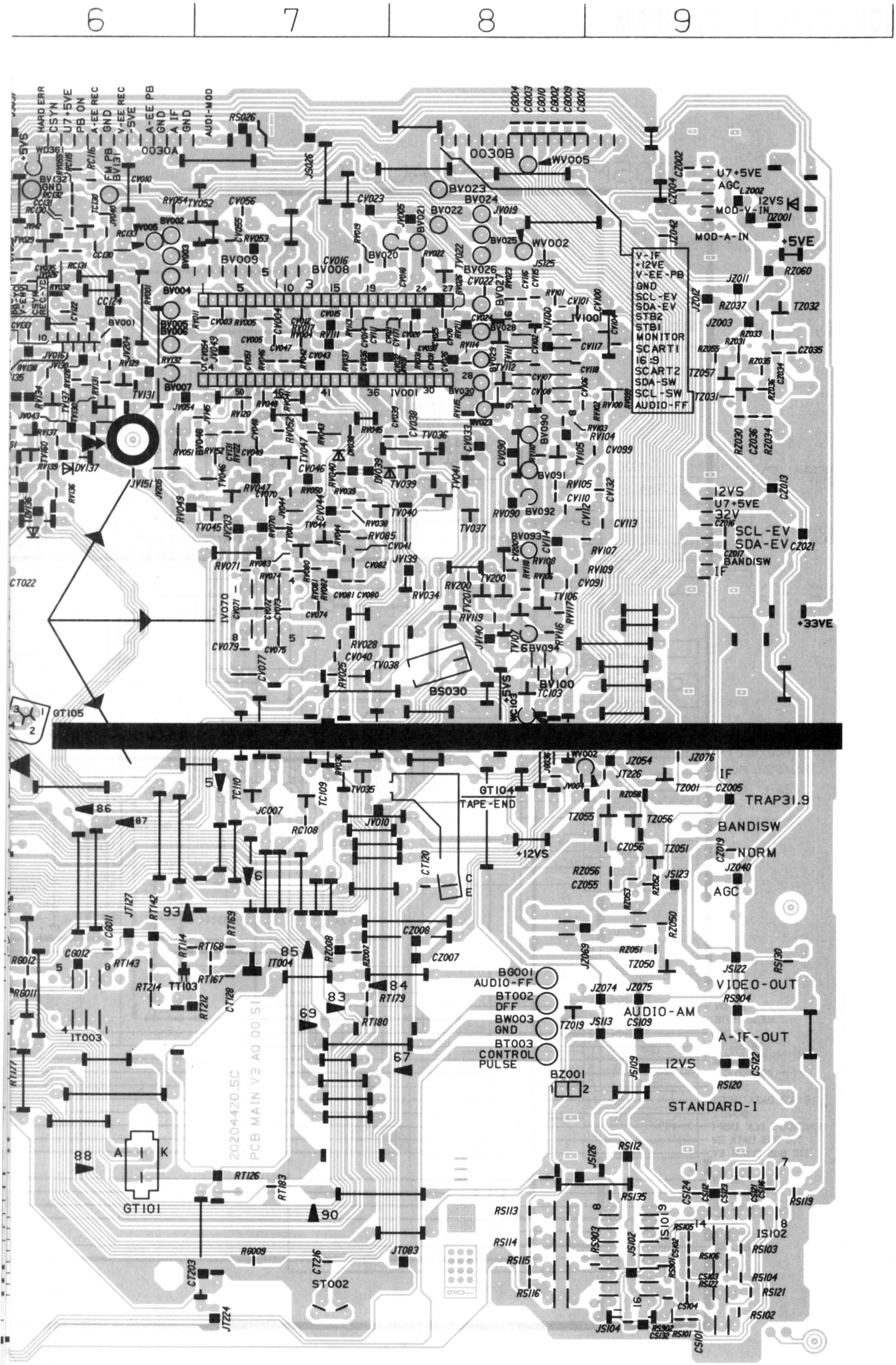
0005M MAIN(AUDIO)
REC AUDIO SIGNAL
PB AUDIO SIGNAL
TS040 RN1404
RS029 47k
RS012 8.2k
CS006 0.01μ
RS010 5.6k
RS006 330k
CS003 1500p
RS003 33k
RS004 220
CS004 6.8μ
RS008 12k
RS011 4.3k
CS014 10μ
RS016 8.2k
RS022 100
CS016 0.22μ
CS022 10μ
CS012 0.22μ
RS014 2.2M
CS002 4.7μ
LINE
TU
AMPL
PB
SP
ALC
MUTE
IS001
BA7795LS
CONVENTIONAL
AUDIO IC
BIAS
REC
EP
REC
CS001 1500p
CS005 22μ
RS005 820
RS007 820
CS007 47μ
RS013 36k
RS015 6.8k
RS019 20k
CS021 10μ
RS017 1k
LS019 8.2m
RS021 33k
BS004
SP LP
PB ON
AUDIO MUTE
RECORD
ERASECTL
C BIAS
PB REC CTL
SCART2
16:9/S DATA/INSP2
SCART1
MONITER/S CLK INSP1
IIC BUS DATA EV
IIC BUS CLOCK EV
TO SERVO/LOGIC
(PAGE 3-36)
V EE PB
V IF
A EE PB
A IF
TO PIF
(PAGE 3-31)
V EE REC
TO VIDEO
(PAGE 3-41)


V:REC (V):PLAY
REC AUDIO SIGNAL
PB AUDIO SIGNAL
70041671
RS041
18
LS030
CS038
100μ
CS033
0.056μ
14.0V
(14.0V)
TS039
BC848/B
RS036
10k
0V
(0V)
4V
(0V)
CS031
2700p
RS042
0
13.8V
(14.4V)
TS030
BC847/B
RS040
4.7k
RS031
4.7k
CS066
0.047μ
RS039
4.7k
0V
(0V)
0V
(0V)
RS030
4.7
CS034
220p
CS036
1μ
CS030
0.01μ
RS034
100k
RS002
10
BS002
BS001
BS030
1 FULL ERASE HEAD
2 GND
FULLERASE HEAD
BS031
1 AUDIO ERASE HEAD
2 GND
3 AUDIO REC
4 AUDIO PB
5 NC
6 CTL BIAS
7 RP CTL
AUDIOERASE HEAD
AUDIO HEAD
CONTROL HEAD
0030B
1 NC
2 NC
3 NC
4 SCART2
5 16:9
6 SCART1
7 MONITOR
8 NC
9 NC
10 IIC BUS DATA EV
11 IIC BUS CLOCK EV
12 GND
13 V EE PB
14 U4 +12VE
15 V IF
RG009 2.2k
RG010 2.2k
RG012 220
RG011 220
TO BX003
0030M TERMINAL
(PAGE 3-45)
0030A
1 NC
2 GND
3 A IF
4 GND
5 A EE PB
6 -5VE
7 V EE REC
8 GND
9 A EE REC
10 NC
11 U7 +5VE
12 NC
13 NC
RS026
0
TO BX004
0030M TERMINAL
(PAGE 3-45)
U2 +5VS
U7 +5VE
-5VE
U4 +12VE
+14VE
TO PIF
(PAGE 3-31)

9. PC BOARDS

9-1. Main (PIF, Servo/Logic, Video, Audio) PC Board


1
2
3
4
5
A
B
C
D
E
F
G
JZ045
+12VE
TW005
E C B
JW017
JG020
JT223
JT222
JT221
JW016
RW030
JW009
JW030
RW029
RW028
RW027
TW002
BW005
GND
BS004
AUDIO-MUTE
TW001
RW002
JW004
JS020
RW003
JW006
RW009
CS066
DW006
DW005
DW002
RW011
CW007
RW010
RS023
RS029
TS040
RS012
RW020
RW019
RS016
CS016
RS014
RS008
RS006
JS027
RS004
RS003
RS011
CS003
CS001
IS001
24
RS015
RS017
RS013
RS019
JS021
JS039
JS019
GND
+6VE
A ENV
A-PB
A-REC
+12VS
GND
0030C
JS045
RS030
JS017
TS038
CS031
CS030
RS031
RS040
TS039
JS012
RS036
RC113
RC111
RC110
CC116
RC122
JG007
RS039
RS042
RS044
TS030
JC014
RC114
RV902
RS043
BS002
BS001
RS002
BS031
JS037
JS007
CTL-BIAS
A-PB
GND
RC112
WC103
IC100
CC104
CC101
JV024
RC117
JC008
BT005
CAMC
CAMA
LOUTB
CAMB
GND
LOUTA
RT016
CT010
RPCTL
JS041
A-REC
AUDI-ERASE
COMP
DFFHASEL
+5VS
GND
DV132
TC112
RV901
JT032
RT164
TT110
RT017
RT020
IT002
JT111
RT021
CT020
JT130
JT129
JT099
RT133
CT129
RT132
CT150
IT005
+14VE
RT200
RT201
RT202
DT200
DT201
AVCCI
C-REG
LIMITER
CAP F/R
CFG BIAS
FGA
FGB
GND
GND
VMC
TT200
CT204
TT109
RT181
RT157
RT162
RT165
RT171
RT185
RT156
33
CT138
RT155
JT207
RT131
RT147
CT137
CT135
RT182
BT006
10
RT137
CT121
CT134
CT131
RT134
RT136
CT132
DT106
RT149
TT106
RT148
TT107
RT150
RT153
RT151
RT152
TW006
TW008
RW025
JT192
JT115
CT200
CW004
+20VE
JT006
+6VE
TT101
JT206
JT176
JT169
16
BW001
RW006
+6VE
+6VE
+14VE
+14VE
+14VE
GND
GND
GND
GND
VM+20VE
VM+20VE
POWER GOOD
U3+33VE
U5-32VE
UH-
UH+
CW002
RW005
CW003
RT159
TT104
CT142
CT141
30
23
19
4
20
3
92
RT204
DT101
CT119
TAPE-START
GT103
45
38
42
28
100
JT004
CT107
22
10
11
25
15
7
RT100
RT101
RT170
RT125
89
TT100
GT100
JT044
CT127
RT144
JT214
RT215
39
CT213
35
RT110
RT111
RT113
21
CT114
CT112
RT109
98
13
50
RT128
RT176
47
41
36
37
32,34
RT107
RT106
16
26
27
14,62,64
49
POWER GOOD
RT108
CT111
JT018
CT100
CT125
70
44
CT109
RT105
46
JT183
RT024
91
99
1,12,56
CT126
94
A
JT009
81
82
RT127
GT102
51
58
48
CT102
CT103
63
57
61
60
72
24
WS101
JT164
JT182
JT172
CT104
CT105
CT013
54
73
74
68
69
75
76
RT075
RT103
CT123
RT116
TT102
CT106
78
79
CT139
76
71
80
CT146
JT001
+6VE
UH+
GND
KDB-SLK
KDB-KS
IR-IN
55
BT001
14
-32VE
UH-
+5VD
KDB-SK
KDB-STB
J9005
KDB-RESET
CAMPAUSE
59
95
52
97
96
RT184
WS101

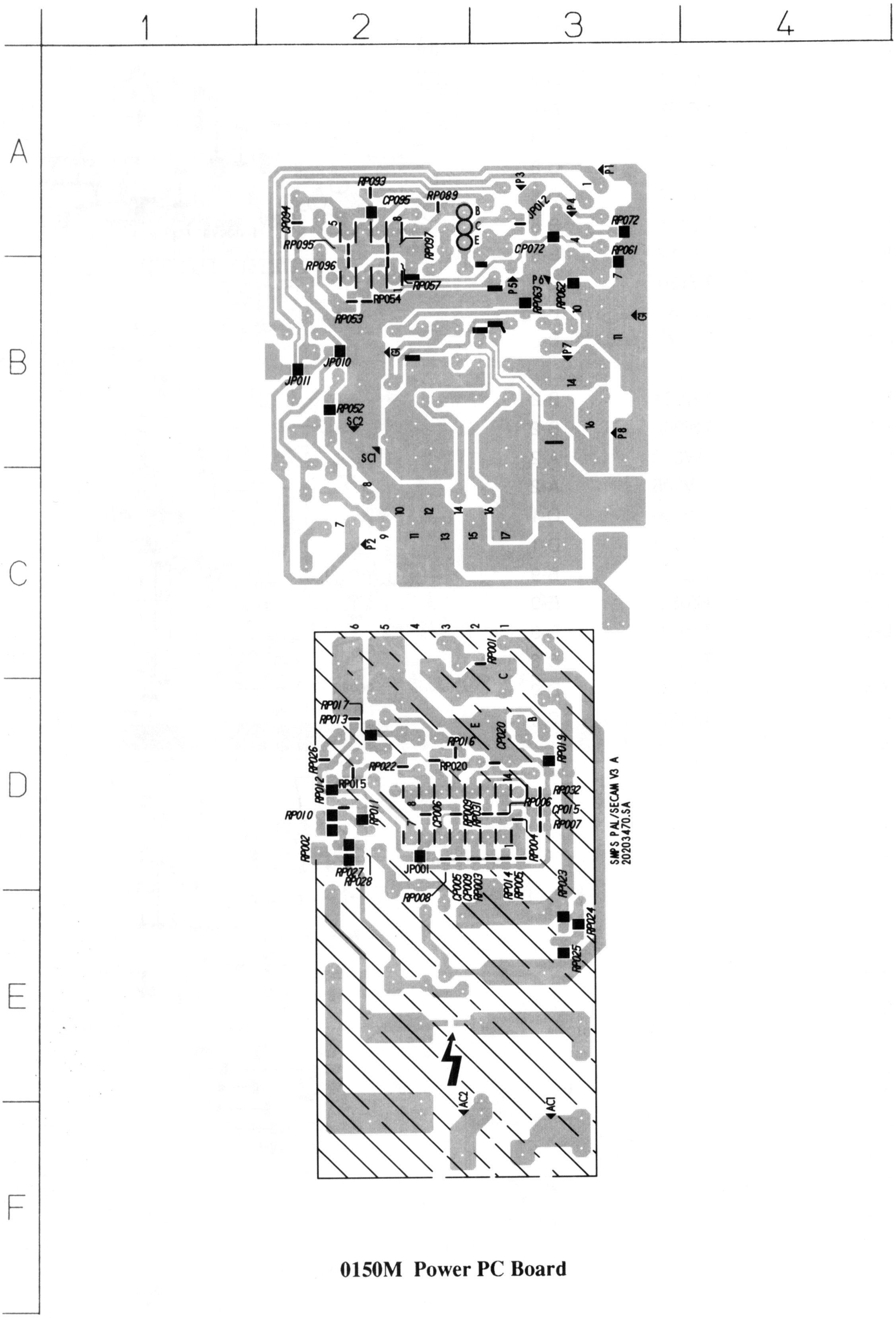

6
7
8
9
HARD ERR
CSYN
U7+5VE
PB ON
A-EE REC
GND
V-EE REC
-5VE
A-EE PB
GND
A IF
GND
AUDI-MOD
0030A
0030B
WV005
BV023
BV024
BV022
WV002
BV020
BV026
BV027
BV028
BV029
BV030
BV009
BV008
BV004
BV005
BV006
BV007
BV001
BV002
BV003
IV001
V-IF
+12VE
V-EE-PB
GND
SCL-EV
SDA-EV
STB2
STB1
MONITOR
SCART1
16:9
SCART2
SDA-SW
SCL-SW
AUDIO-FF
U7+5VE
AGC
12VS
MOD-V-IN
DZ001
MOD-A-IN
+5VE
12VS
U7+5VE
32V
SCL-EV
SDA-EV
BANDISW
IF
+33VE
BV090
BV091
BV092
BV093
BV094
BV100
BS030
TC103
JVI51
IV070
GT105
CT022
GT104
TAPE-END
+12VS
IF
TRAP31.9
BANDISW
NORM
AGC
VIDEO-OUT
AUDIO-AM
A-IF-OUT
12VS
STANDARD-I
BG001
AUDIO-FF
BT002
DFF
BW003
GND
BT003
CONTROL
PULSE
BZ001
IT003
IT004
TT103
GT101
ST002
20204420.5C
PCB MAIN V3 A0 00 S1
IS101
IS102
86
87
93
85
84
83
69
67
88
90

ervo/Logic, Video, Audio) PC Board

SYMBOL NO.	LOCATION
DT200	C-2
DT201	C-2
DW002	B-2
DW005	A-3
DW006	A-3
DZ001	A-9
GT100	E-5
GT101	F-6
GT102	F-4
GT103	E-2
GT104	D-8
GT105	D-6
IS001	B-3
IT001	F-3
IT002	C-4
IT003	F-6
IT004	B-7
IT005	C-5
IV001	B-8
IV070	C-7
IV100	B-9
TS030	B-4
TS039	A-4
TS040	A-3
TT100	E-5
TT101	D-2
TT102	G-3
TT104	D-3
TT106	D-4
TT107	D-4
TT109	C-3
TT110	C-3
TT200	C-2
TV022	B-8
TV029	B-6
TV035	D-7
TV036	C-8
TV037	C-8
TV038	D-7
TV039	C-8
TV041	C-8

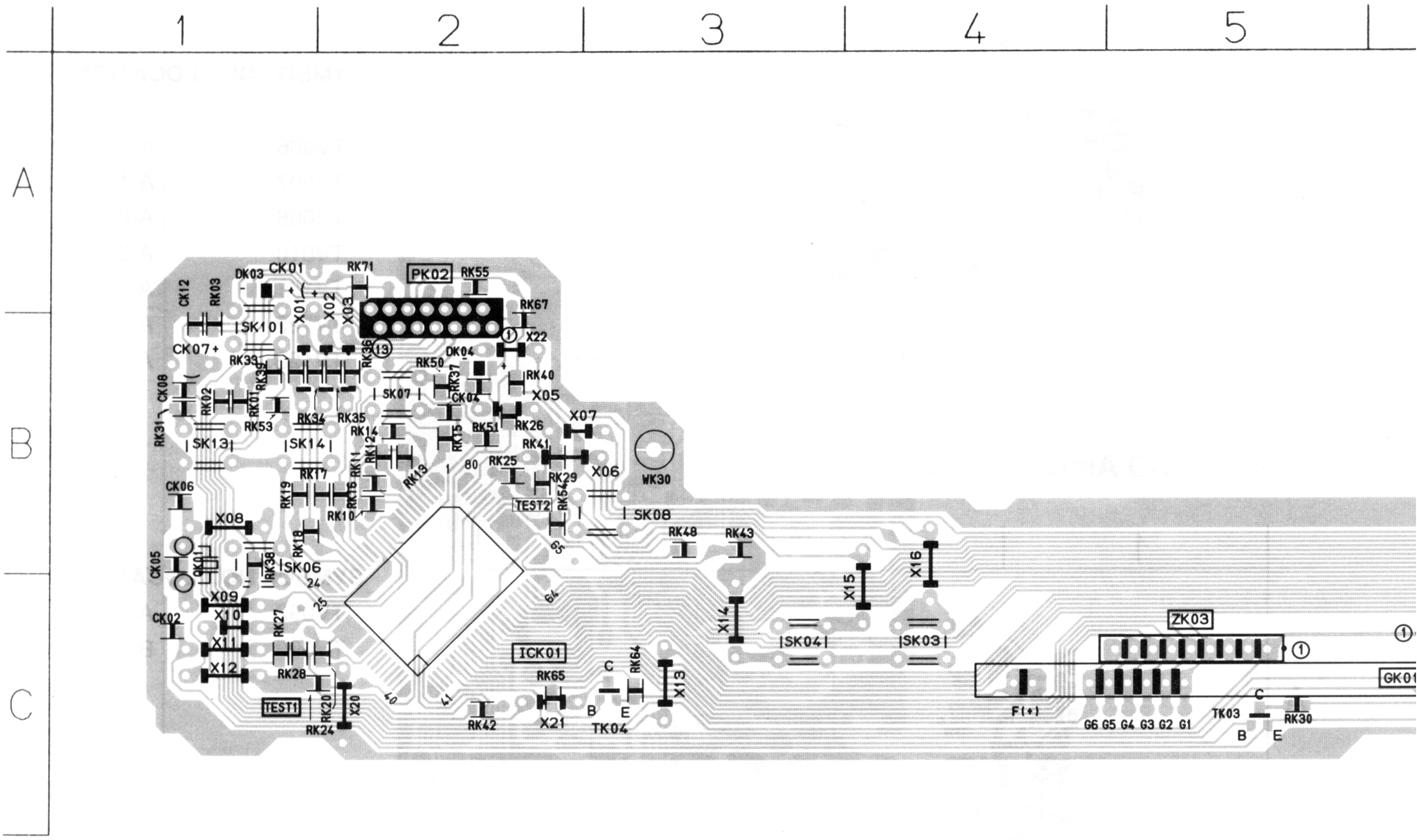
SYMBOL NO.	LOCATION
TV044	C-7
TV045	C-7
TV046	C-7
TV047	C-7
TV052	A-7
TV105	C-8
TV106	C-8
TV107	D-8
TV111	B-8
TV112	B-8
TV130	B-6
TV131	B-6
TV137	B-6
TW001	B-2
TW002	B-2
TW003	A-2
TW005	A-2
TW006	D-1
TW008	D-1
TZ032	B-9
TZ050	E-9
TZ051	E-9
TZ055	D-8
TZ056	D-9
TZ057	B-9

9-2. Power PC Board


1
2
3
4
A
B
C
D
E
F
RP093
CP095
RP089
CP094
RP095
RP096
RP097
RP057
RP054
RP053
B
C
E
P3
P1
P4
JP012
RP072
CP072
RP061
P5
P6
RP063
RP062
JP010
JP011
RP052
SC2
SC1
P7
P8
P2
RP001
RP017
RP013
RP016
CP020
RP019
RP026
RP022
RP020
RP012
RP015
RP032
RP006
CP015
RP007
RP010
RP011
CP006
RP009
RP031
RP004
RP002
RP027
RP028
JP001
RP008
CP005
CP009
RP003
RP014
RP005
RP023
RP024
RP025
AC2
AC1
SMPS PAL/SECAM V3 A
2020347O.SA

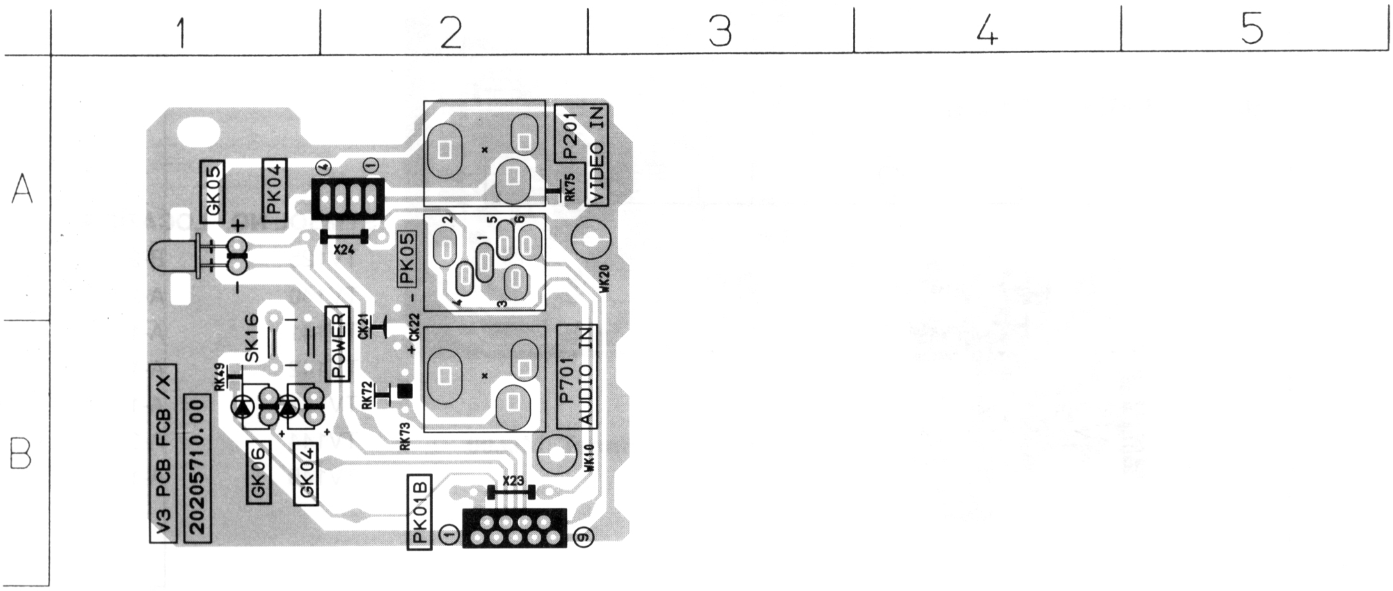
0150M Power PC Board

9-3. KDB PC Board

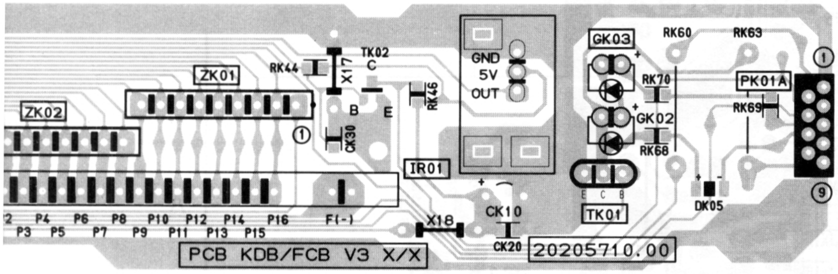

1
2
3
4
5
A
B
C
PK02
RK55
RK71
CK01
DK03
CK12
RK03
SK10
X01
X02
X03
RK67
X22
13
1
CK07
RK39
RK32
RK36
DK04
RK50
RK37
RK40
X05
CK08
RK02
RK01
RK53
SK07
CK04
RK31
RK34
RK35
RK14
RK15
RK51
RK26
X07
SK13
SK14
RK12
RK41
RK17
RK11
RK13
80
RK25
RK29
X06
WK30
CK06
RK19
RK16
RK10
TEST2
RK54
SK08
X08
RK18
RK48
RK43
CK05
QK01
RK38
SK06
24
65
X15
X16
X09
25
64
X10
X14
CK02
RK27
SK04
SK03
X11
ZK03
X12
RK28
ICK01
C
RK64
X13
TEST1
RK20
X20
40
41
RK65
RK24
RK42
X21
B
E
TK04
F(+)
G6 G5 G4 G3 G2 G1
TK03
RK30
GK01

0210M KDB PC Board

9-4. FCB PC Board

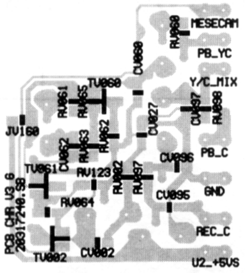

1
2
3
4
5
A
B
GK05
PK04
④
①
X24
+
-
P201
VIDEO IN
RK75
PK05
2
1
5
6
4
3
WK20
SK16
POWER
CK21
CK22
RK49
RK72
P701
AUDIO IN
RK73
GK06
GK04
WK10
V3 PCB FCB /X
20205710.00
PK01B
X23
⑨

0212M FCB PC Board


6
7
8
9
ZK01
ZK02
RK44
X17
TK02
C
B
E
RK46
CK30
GND
5V
OUT
IR01
GK03
RK60
RK63
RK70
PK01A
RK69
GK02
RK68
TK01
DK05
CK10
CK20
X18
①
⑨
P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13 P14 P15 P16 F(-)
PCB KDB/FCB V3 X/X
20205710.00

SYMBOL NO.	LOCATION
DK03	A-1
ICK01	C-2
IR01	C-7
TK04	C-3

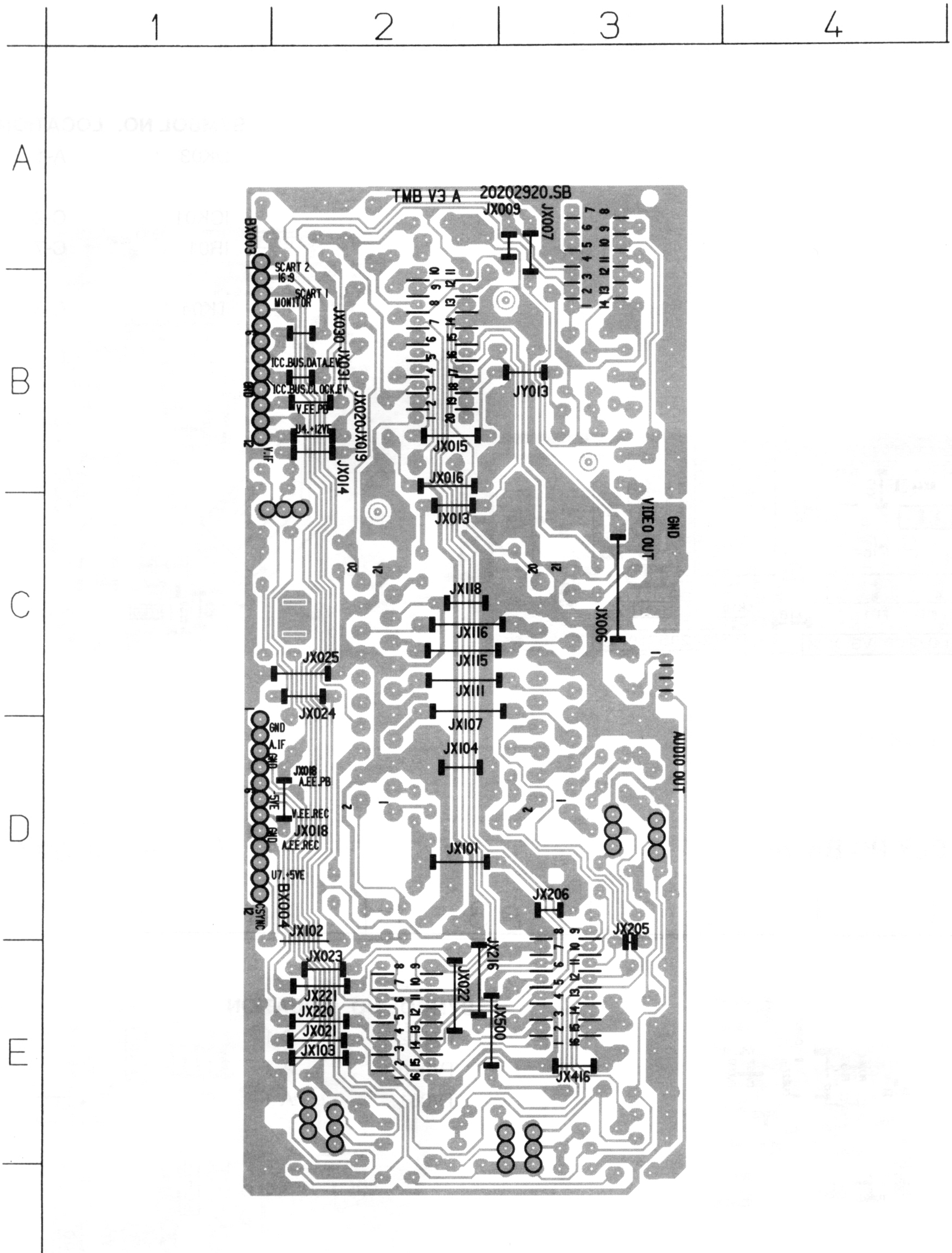
9-5. CHR DLY PC Board


1
2
3
4
A
B
MESECAM
RV060
PB_YC
CV060
TV060
Y/C_MIX
RV061
RV065
CV097
RV098
JV160
CV027
RV062
CV062
RV063
PB_C
CV096
TV061
RV123
RV002
RV097
GND
RV064
CV095
REC_C
PCB CHR V3.0
20317240.00
TV002
CV002
U2_+5VS

0041M CHR DLY PC Board

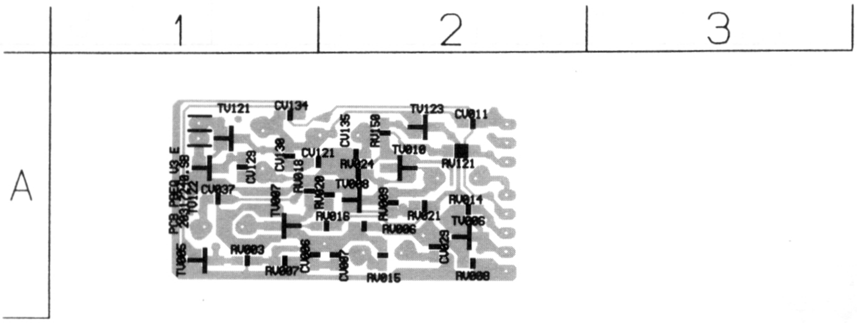
SYMBOL NO.	LOCATION
TV002	B-1
TV060	A-1
TV061	A-1

9-6. Terminal PC Board


1
2
3
4
A
B
C
D
E
F
TMB V3 A
20202920.SB
JX009
JX007
BX003
SCART 2
16:9
SCART 1
MONITOR
ICC.BUS.DATA.EV
ICC.BUS.CLOCK.EV
V.EE.PB
U4.+12VE
V.IF
GND
JX030
JX031
JX020
JX019
JX014
JX015
JX016
JX013
JY013
VIDEO OUT
GND
JX006
JX118
JX116
JX115
JX111
JX107
JX104
JX101
JX025
JX024
GND
A.IF
GND
JX018
A.EE.PB
5TE
V.EE.REC
JX018
GND
A.EE.REC
U7.+5VE
BX004
CSYNC
AUDIO OUT
JX206
JX205
JX102
JX023
JX221
JX220
JX021
JX103
JX022
JX216
JX500
JX416

0030M Terminal PC Board

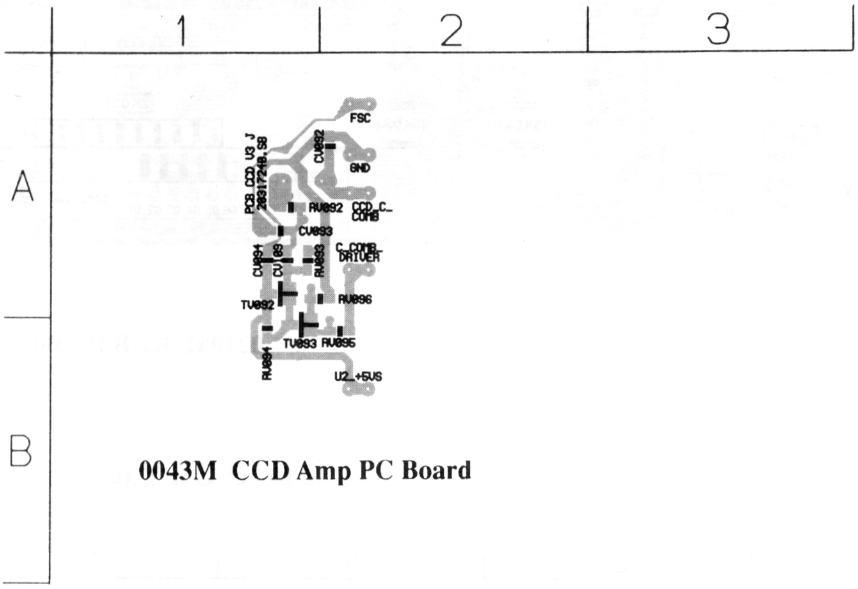
9-7. PB EQ PC Board


1
2
3
A
TV121
CV134
TV123
CV011
CV135
RV150
TV010
RV121
PCB PBEQ U3_E
20317230.S8
TV122
CV123
CV130
CV121
RV018
RV024
TV008
RV020
CV037
TV007
RV009
RV014
RV016
RV021
TV006
RV006
TV005
RV003
CV006
CV029
RV007
CV007
RV015
RV008

0040M PBEQ PC Board

SYMBOL NO.	LOCATION
TV005	A-1
TV006	A-2
TV007	A-1
TV008	A-2
TV010	A-2
TV121	A-1
TV122	A-1
TV123	A-2

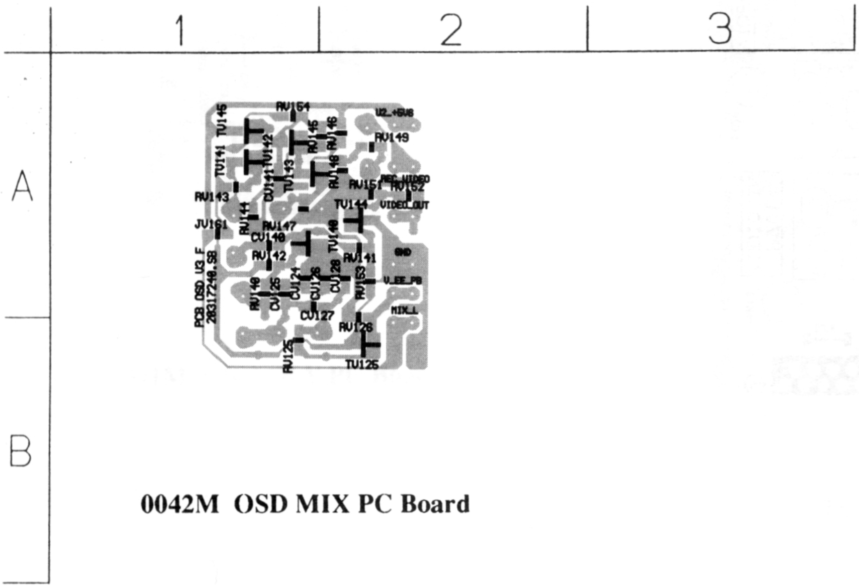
9-8. CCD Amp PC Board


1
2
3
A
B
FSC
PCB CCD U3_J
20317240.S8
CV092
GND
RV092
CCD_C_COMB
CV093
CV094
CV109
RV093
C_COMB_DRIVER
TV092
RV096
TV093
RV095
RV094
U2_+5VS

0043M CCD Amp PC Board

SYMBOL NO.	LOCATION
TV092	A-1
TV093	B-1

9-9. OSD MIX PC Board


1
2
3
A
B
RV154
U2_+5V8
TV145
TV141
TV142
RV145
RV146
RV149
CV141
TV143
RV148
REC_VIDEO
RV151
RV152
RV143
TV144
VIDEO_OUT
RV144
JV161
RV147
CV140
TV140
PCB OSD U3_F
20317240.S8
RV142
GND
RV141
RV140
CV125
CV124
CV126
CV128
RV153
V_EE_PB
MIX_L
CV127
RV126
RV125
TV125

0042M OSD MIX PC Board

SYMBOL NO.	LOCATION
TV125	B-2
TV140	A-2
TV141	A-1
TV142	A-1
TV143	A-1
TV144	A-2
TV145	A-1

SECTION 4
PARTS LIST

SAFETY PRECAUTION

The parts identified by ⚠ mark are critical for safety. Replace only with part number specified.

The mounting position of replacement is to be identical with originals.

The substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

NOTICE

The part number must be used when ordering parts in order to assist in processing, be sure to include the model number and description.

Parts marked # are of chip type and mounted on original PC boards.

However, when they are placed for servicing works, use discrete parts listed on the parts list.

ABBREVIATIONS

1. **Integrated circuit (IC)**
2. **Capacitor (Cap)**

- **Capacitance Tolerance (for Nominal Capacitance more than 10pF)**

Symbol	**B**	**C**	**D**	**F**	**G**	**J**	**K**	**M**	**N**
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20	± 30

Symbol	**P**	**Q**	**T**	**U**	**V**	**W**	**X**	**Y**	**Z**
Tolerance %	+ 100 0	+ 30 −10	+ 50 −10	+ 75 −10	+ 20 −10	+ 100 −10	+ 40 −20	+ 150 −10	+ 80 −20

Ex. 10μF J = 10μF ± 5%

- **Capacitance Tolerance (for Nominal Capacitance 10pF or less)**

Symbol	**B**	**C**	**D**	**F**	**G**
Tolerance pF	± 0.1	± 0.25	± 0.5	± 1	± 2

Ex. 10pF G = 10pF ± 2pF

3. **Resistor (Res)**

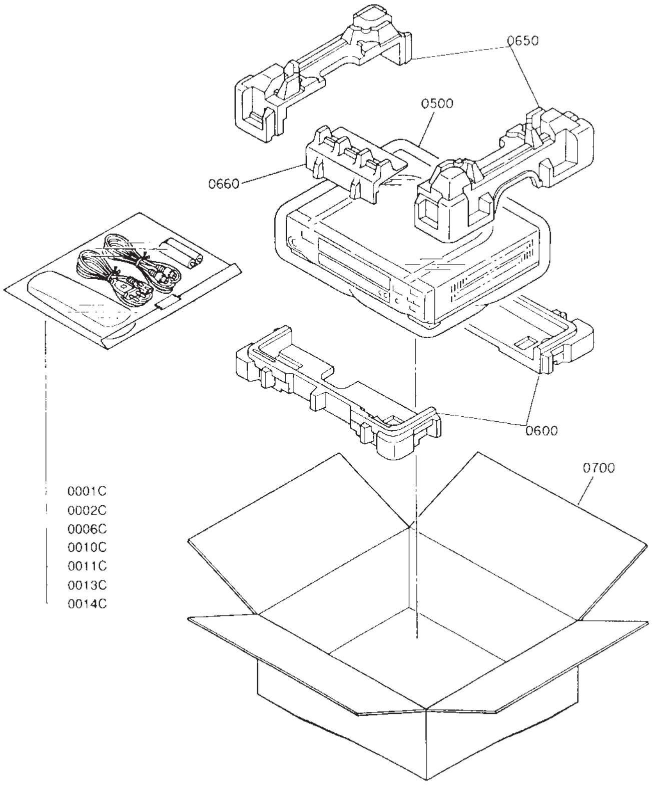
- **Resistance tolerance**

Symbol	**B**	**C**	**D**	**F**	**G**	**J**	**K**	**M**
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20

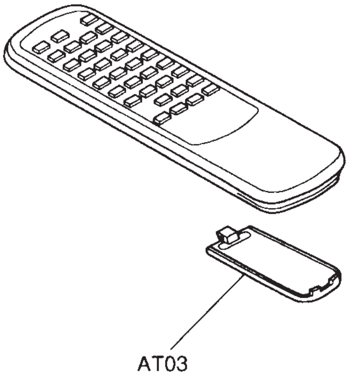
Ex. 470 Ω J = 470Ω ± 5%

4. EXPLODED VIEWS

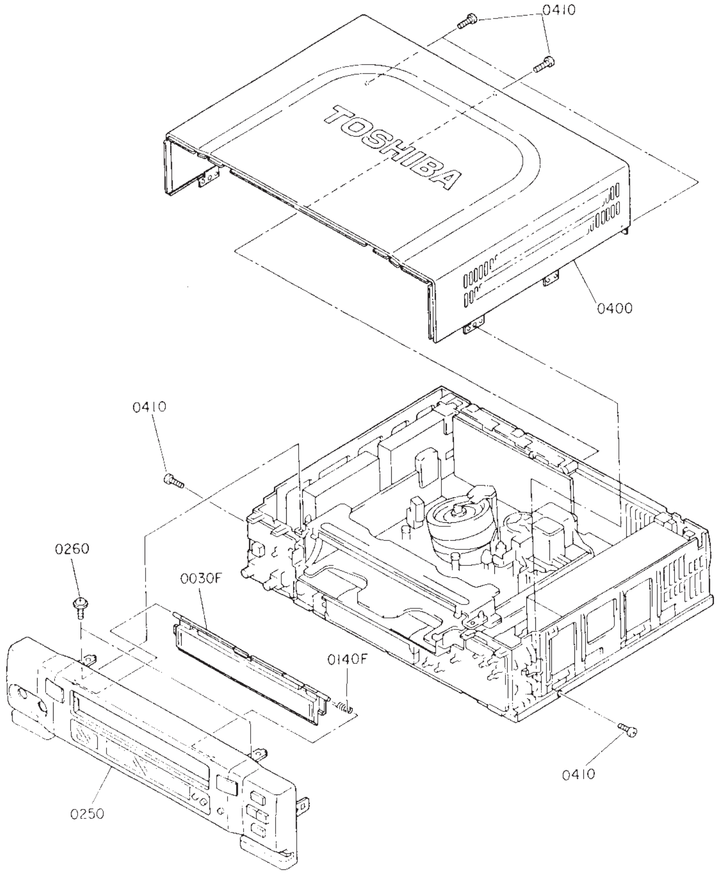
4-1. Packing Assembly


0650
0500
0660
0600
0700
0001C
0002C
0006C
0010C
0011C
0013C
0014C

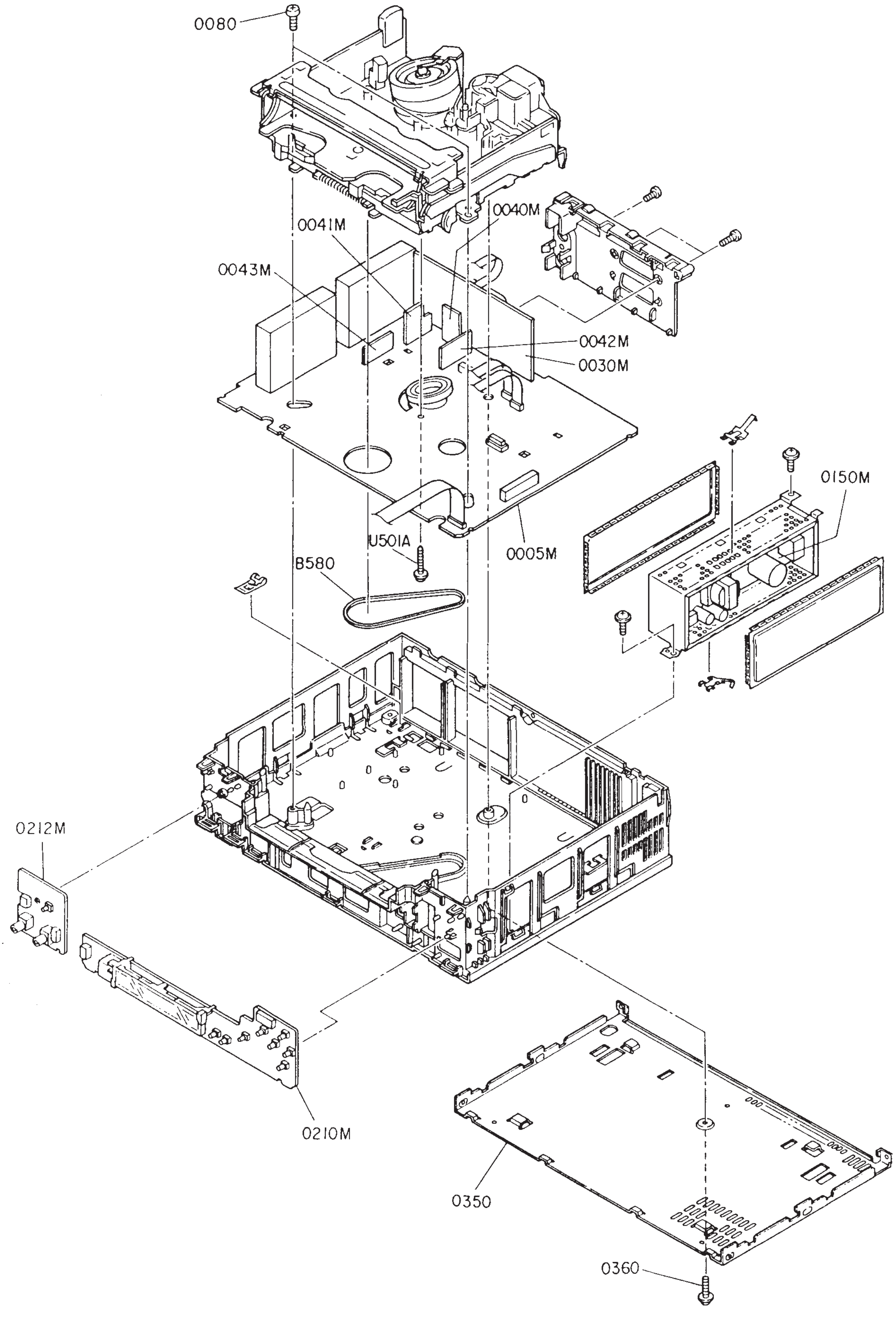
4-2. Remote Control Unit



4-3. Cabinet Assembly

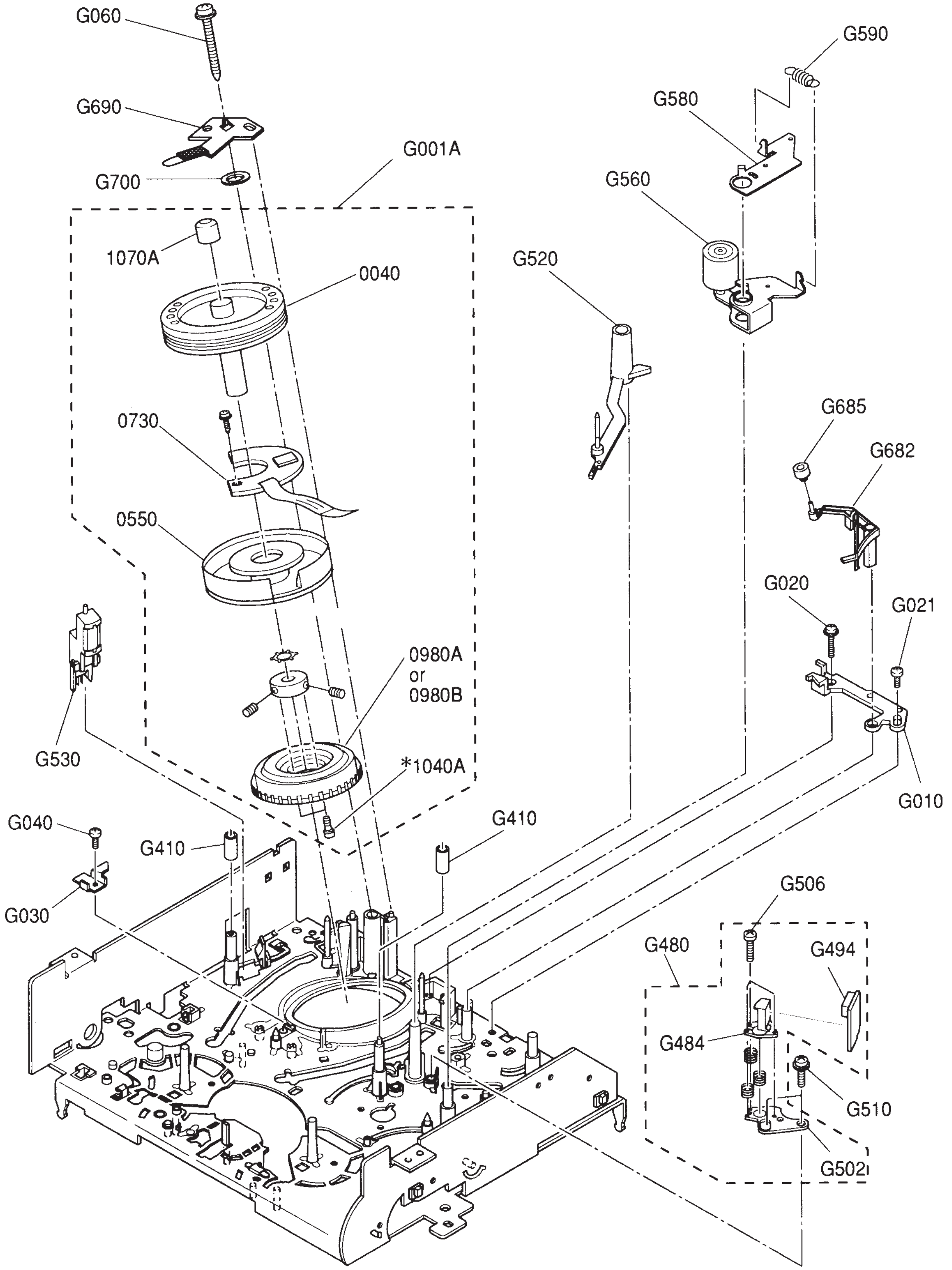

0410
TOSHIBA
0400
0410
0260
0030F
0140F
0410
0250

4-4. Chassis Assembly



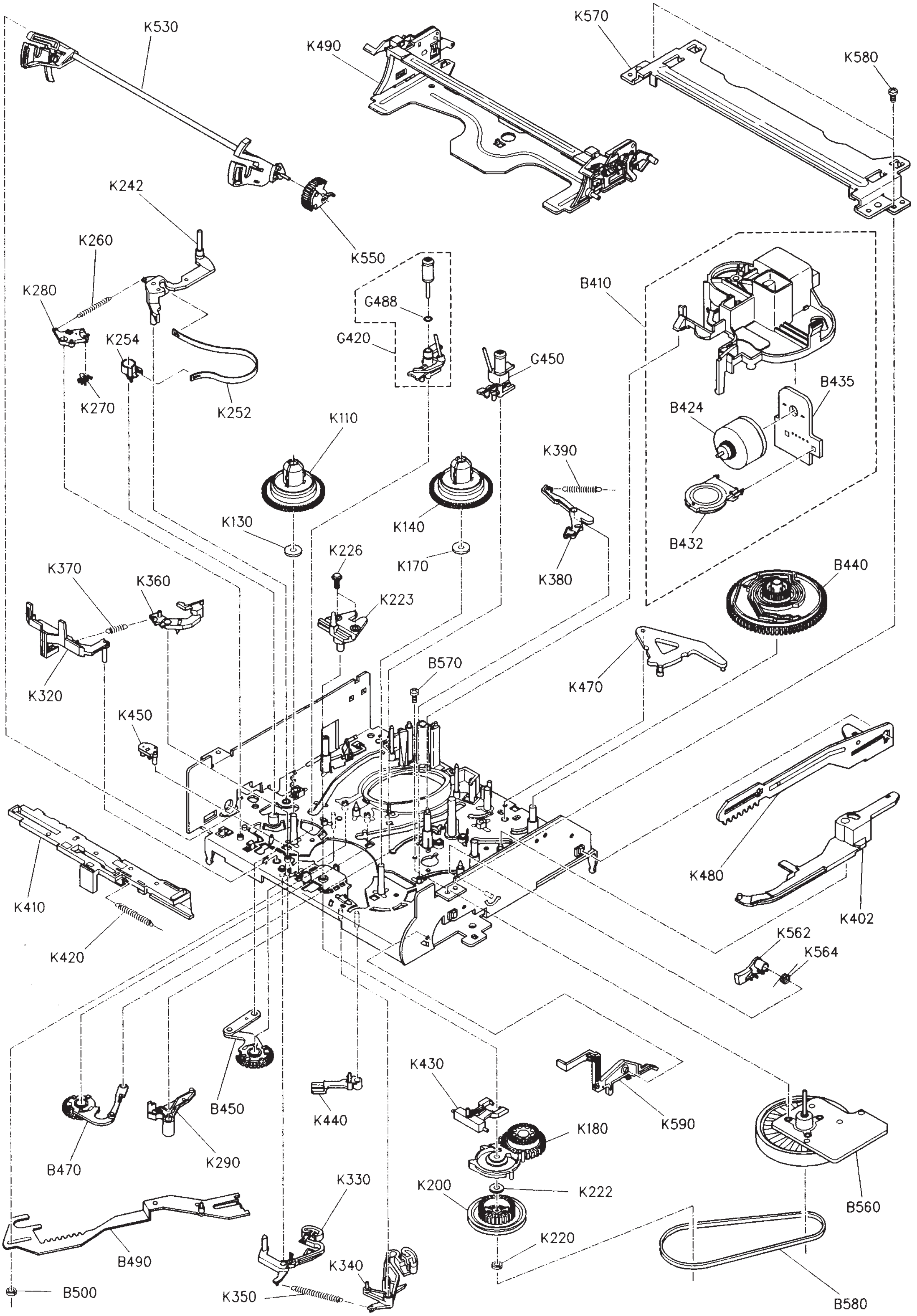
0080
0040M
0041M
0043M
0042M
0030M
0150M
U501A
0005M
B580
0212M
0210M
0350
0360

4-5. Mechanism Assembly (1)


G060
G590
G690
G580
G001A
G700
G560
1070A
G520
0040
G685
0730
G682
0550
G020
G021
0980A
or
0980B
G530
*1040A
G010
G040
G410
G410
G030
G506
G480
G494
G484
G510
G502

*:1040A is used only for
the screw securing type rotor.

4-6. Mechanism Assembly (2)



K530
K490
K570
K580
K242
K550
K260
K280
G488
G420
B410
K254
G450
K270
K252
B435
B424
K110
K390
K130
K140
B432
K226
K170
K380
K370
K360
K223
B440
B570
K470
K320
K450
K410
K480
K402
K420
K562
K564
K430
K590
B450
K440
K180
B470
K290
K330
K200
K222
B560
K220
B490
K340
B500
K350
B580

5. PARTS LIST

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
		- MECHANICAL PARTS -	
0001C	70061489	Owners Manual	English/Russian
0002C	70061529	Owners Manual	Spanish/Italian
0006C	70060040	Cover	
0010C	70012306	Remote Control Unit	
0013C	70011442	Cable	
⚠0014C	70011387	Mains Cord	
0030F	70051631	Cassette Door	
0040	70903992	Upper Cylinder Assy	
0140F	70051372	Spring	
⚠0250	70051623	Front Panel	
0260	72471082	Screw, 3x10mm	
0350	70051141	Bottom Plate	
⚠0400	70051620	Top Cover	
0550	70031714	Lower Cylinder Assy	
0700	70061329	Case	
0980A	70031561	Rotor(Screw Securing Type)	
0980B	70031620	Rotor(Press Fit Securing Type)	
1040A	70031567	Screw	
1070A	70031559	Ground Cap	
AT03	70107067	Case(Battery)	
B410	70031394	Loading Drive Assy	
B424	70031396	Loading Motor Sub Assy	
B432	70031401	Cam Switch	
B435	70031402	Loading Drive Unit	
B440	70051147	Cam Gear	
B450	70031404	S Loading Assy	
B470	70031408	T Loading Assy	
B490	70031412	Loading Slider Assy	
B560	70031498	Capstan Motor Assy	
B570	70070028	Screw, 2.6x6mm	
B580	70031442	Reel Belt	
G001A	70031542	Cylinder Assy	
G010	70031444	Plate(Cylinder)	
G020	70031643	Screw	2.6x5mm
G021	70031644	Screw	2.6x5mm
G030	70031445	Plate(Cylinder)	
G040	70031644	Screw	2.6x5mm
G060	70031449	Screw	
G410	70031348	Guide Sleeve	
G420	70031349	S Slider Assy	
G448	70031505	O Ring	
G450	70031360	T Slider Assy	
G480	70031512	ACE Head Assy	
G484	70031511	ACE Sub Base Assy	
G504	70031508	Spring	
G520	70031370	No.9 Guide Lever Assy	
G530	70031443	FE Head	
G560	70031384	Pinch Lever Assy	
G580	70031390	Pinch Drive Assy	
G590	70031392	Spring	
G680	70031493	Cleaner Lever Assy	
G690	70031540	Ground Brush	
K110	70031328	S Reel Assy	
K130	70031334	Washer	
K140	70031335	T Reel Assy	
K170	70031334	Washer	
K180	70031339	Idle Arm Assy	
K200	70031345	Center Gear Pully	
K220	70031503	Washer	
K222	70031527	Washer	
K242	70031374	Tension Lever Sub Assy	
K252	70031376	Band Brake Sub Assy	
K254	70031377	Band Holder	
K260	70031660	Spring	
K270	70031379	Hook Lever	
K280	70031380	Hook Lever	
K290	70031381	Tension Drive Lever	
K320	70031466	Rec Inhibit Lever	
K330	70031420	S Main Brake Assy	
K340	70031421	T Main Brake Assy	
K350	70031422	Spring	
K360	70031469	S Soft Brake Lever	
K370	70031423	Spring	
K380	70031424	T Soft Brake Assy	
K390	70031426	Spring	
K402	70031471	Drive Lever	
K410	70031427	Cam Slider	
K420	70031428	Spring	
K430	70031472	Idle Up Down Lever	
K440	70031473	Idle Kick Lever	
K450	70031476	Idle Centering Lever	
K470	70031477	Cam Lever	
K480	70031430	FL Drive Slider	
K490	70031431	Cassette Holder Assy	
K530	70031415	Drive Arm Assy	
K550	70051150	Drive Lever Gear	
K562	70031482	Arm Brake Lever	
K564	70031440	Spring	
K570	70031441	Top Bracket	
K590	70031483	Door Open Lever	
U501A	70070070	Screw	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
		- ELECTRICAL PARTS -		
■0005M	70090876	P C Board Assy	Main	
		- INTEGRATED CIRCUITS -		
IS001	70011973	IC	BA7795LS	
IT001	70012473	IC	TMP90CR74DF-7481	
IT002	70011888	IC	TA7291S	
IT003	70011807	IC	ST24C02AB1	
IT004	70011808	IC	PST7032MT	
IT005	70011887	IC	TB6515AP	
IV001	70011884	IC	TA8892AN	
IV070	70011890	IC	TA8844P	
IV100	70011891	IC	TL8843P	
		- TRANSISTORS -		
TC112	70010947	Transistor	BC858	
TS030	70010331	Transistor	BC847B	
TS038	A6004040	Transistor, Chip	RN1404	
TS039	70010150	Transistor	BC848B	
TS040	A6004040	Transistor, Chip	RN1404	
TT100	70010150	Transistor	BC848B	
TT101	70010942	Transistor	BC848	
TT102	70010947	Transistor	BC858	
TT104	70010942	Transistor	BC848	
TT106	A6004040	Transistor, Chip	RN1404	
TT107	A6004040	Transistor, Chip	RN1404	
TT109	A6004020	Transistor, Chip	RN1402	
TT110	70010332	Transistor	BC857B	
TT111	70011386	Transistor	2SA1020-Y	
TT200	70010131	Transistor	BC337-40	
TV022	70010150	Transistor	BC848B	
TV029	70010150	Transistor	BC848B	
TV035	A6004020	Transistor, Chip	RN1402	
TV036	A6004020	Transistor, Chip	RN1402	
TV037	A6004020	Transistor, Chip	RN1402	
TV038	A6004020	Transistor, Chip	RN1402	
TV039	A6004020	Transistor, Chip	RN1402	
TV040	70010150	Transistor	BC848B	
TV041	A6004020	Transistor, Chip	RN1402	
TV044	70011963	Transistor, Chip	BC848/A	
TV047	70010947	Transistor	BC858	
TV052	70010947	Transistor	BC858	
TV105	70010150	Transistor	BC848B	
TV106	70010150	Transistor	BC848B	
TV107	70011963	Transistor, Chip	BC848/A	
TV111	70010150	Transistor	BC848B	
TV112	70010150	Transistor	BC848B	
TV130	70010942	Transistor	BC848	
TV131	70010947	Transistor	BC858	
TV137	A6004020	Transistor, Chip	RN1402	
TW001	70010942	Transistor	BC848	
TW002	A6014030	Transistor, Chip	RN2403	
TW003	A6325549	Transistor	2SC2236-Y	
TW005	A6325549	Transistor	2SC2236-Y	
TW006	70010947	Transistor	BC858	
TW008	A6004050	Transistor, Chip	RN1405	
TZ001	A6004020	Transistor, Chip	RN1402	
TZ032	70010947	Transistor	BC858	
TZ050	70010150	Transistor	BC848B	
TZ051	70010947	Transistor	BC858	
TZ055	A6004020	Transistor, Chip	RN1402	
TZ056	A6004020	Transistor, Chip	RN1402	
TZ057	70010947	Transistor	BC858	
GT103	70010181	Transistor, Photo	PT493F	
GT104	70010181	Transistor, Photo	PT493F	
		- DIODES -		
DT102	70012342	Diode	1N4001	
DT103	70012342	Diode	1N4001	
DT104	70012342	Diode	1N4001	
DT107	70012342	Diode	1N4001	
DT108	70012342	Diode	1N4001	
DT200	70011968	Diode, Zener	ZMM5.1	
DT201	70010965	Diode	LL4448	
DT202	70012342	Diode	1N4001	
DT203	70012342	Diode	1N4001	
DT204	70010153	Diode	1N4148	
DT205	70010153	Diode	1N4148	
DV038	70010342	Diode, Chip	LL4148	
DV039	70010342	Diode, Chip	LL4148	
DV132	70010342	Diode, Chip	LL4148	
DV136	70010965	Diode	LL4448	
DW001	70011967	Diode, Zener	ZPD12	
DW002	70010965	Diode	LL4448	
DW005	70011968	Diode, Zener	ZMM5.1	
DW006	70010965	Diode	LL4448	
DW007	70012342	Diode	1N4001	
DW008	70012342	Diode	1N4001	
DZ001	70011968	Diode, Zener	ZMM5.1	
GT100	70010180	Diode, LED	GL451V	
		- COILS -		
LS019	23237729	Coil, Peaking	TRF4822AP	
LS022	23237729	Coil, Peaking	TRF4822AP	
LS030	70011369	Transformer		
LT103	23238710	Coil, Peaking	TRF4220AJ	
LT105	70010920	Coil, Peaking		
LT106	70011953	Coil, Peaking		
LV009	23289181	Coil, Peaking	TRF4181AF	
LV012	70010920	Coil, Peaking		
LV047	70012098	Coil, Peaking		
LV054	70010803	Coil, Peaking		
LV084	23237981	Coil, Peaking	TRF4330AC	
LV103	23237981	Coil, Peaking	TRF4330AC	
LV104	70011772	Coil, Peaking		
LV105	70011576	Coil, Peaking		
LV107	70011576	Coil, Peaking		
LV114	70011546	Coil, Peaking		
LZ002	70012165	Coil, Peaking		
LZ051	70010924	Coil, Peaking		
LZ055	70011772	Coil, Peaking		
		- CAPACITORS -		
CC116	70041096	Chip Jumper		
CG011	70041873	Cap, Chip	100pF	K
CG012	70041868	Cap, Chip	100pF	K 50V
CS001	70041916	Cap, Chip	1.5nF	K 50V
CS002	70040738	Cap, Electrolytic	4.7μF	25V
CS003	70041155	Cap, Chip	1.5nF	J 50V
CS004	70041869	Cap, Electrolytic	6.8μF	M 16V
CS005	24633220	Cap, Electrolytic	22μF	M 16V
CS006	24591103	Cap, Plastic	0.01μF	J 50V
CS007	70040415	Cap, Electrolytic	47μF	M 16V
CS012	70041009	Cap, Chip	220nF	Z 50V
CS014	24797100	Cap, Electrolytic	10μF	M 50V
CS016	70041009	Cap, Chip	220nF	Z 50V
CS021	24797100	Cap, Electrolytic	10μF	M 50V
CS022	24797100	Cap, Electrolytic	10μF	M 50V
CS023	24591473	Cap, Plastic	0.047μF	J 50V
CS024	70041632	Cap, Plastic	180nF	J 50V
CS030	70041596	Cap, Chip	10nF	K 50V
CS031	70041490	Cap, Chip	2.7nF	M 50V
CS033	70040053	Cap, Plastic	56nF	J 63V
CS034	24214221	Cap, Ceramic	220pF	K 500V
CS036	24636010	Cap, Electrolytic	1μF	M 50V
CS038	24794101	Cap, Electrolytic	100μF	M 16V
CS065	70041411	Cap, Plastic	12nF	J 63V
CS066	70041625	Cap, Chip	47nF	M 25V
CS119	70040738	Cap, Electrolytic	4.7μF	25V
CT010	24285222	Cap, Chip	2200pF	K 50V
CT011	70042112	Cap, Electrolytic	47μF	M 16V
CT012	70041118	Cap, Chip	220pF	J 50V
CT013	70041118	Cap, Chip	220pF	J 50V
CT020	70041468	Cap, Chip	100nF	Z 25V
CT021	70041596	Cap, Chip	10nF	K 50V
CT022	70041596	Cap, Chip	10nF	K 50V
CT023	70041596	Cap, Chip	10nF	K 50V
CT100	70041328	Cap, Chip	100nF	Z 25V
CT102	24774470	Cap, Chip	47pF	J 50V
CT103	24774470	Cap, Chip	47pF	J 50V
CT104	70041011	Cap, Chip	10pF	J 50V
CT108	70041037	Cap, Electrolytic	47μF	M 16V
CT109	24774101	Cap, Chip	100pF	J 50V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CT110	70041037	Cap, Electrolytic	47μF	M 16V
CT111	24774101	Cap, Chip	100pF	J 50V
CT112	70040245	Cap, Ceramic, Chip	150pF	J 50V
CT116	70041054	Cap, Electrolytic	1μF	M 50V
CT117	70041054	Cap, Electrolytic	1μF	M 50V
CT119	70040247	Cap, Ceramic, Chip	1nF	J 50V
CT120	70040247	Cap, Ceramic, Chip	1nF	J 50V
CT121	70041626	Cap, Chip	100nF	M 25V
CT123	24774120	Cap, Chip	12pF	J 50V
CT125	70041328	Cap, Chip	100nF	Z 25V
CT126	70041328	Cap, Chip	100nF	Z 25V
CT128	70041596	Cap, Chip	10nF	K 50V
CT129	70040730	Cap, Chip	100nF	M 25V
CT131	70040989	Cap, Chip	10nF	K 50V
CT132	70040989	Cap, Chip	10nF	K 50V
CT133	70041713	Cap, Electrolytic	100μF	M 16V
CT134	70041468	Cap, Chip	100nF	Z 25V
CT135	70040989	Cap, Chip	10nF	K 50V
CT137	24285102	Cap, Chip	1000pF	K 50V
CT138	24285102	Cap, Chip	1000pF	K 50V
CT139	24774100	Cap, Chip	10pF	D 50V
CT141	70041328	Cap, Chip	100nF	Z 25V
CT142	70041468	Cap, Chip	100nF	Z 25V
CT145	70041111	Cap, Electrolytic	470μF	M 10V
CT146	70041023	Cap, Chip	22nF	M 50V
CT148	70041292	Cap, Electrolytic	100μF	M 6.3V
CT200	70040730	Cap, Chip	100nF	M 25V
CT201	24203470	Cap, Electrolytic	47μF	M 16V
CT202	70011764	Cap, Electrolytic	220μF	M 6.3V
CT203	70041468	Cap, Chip	100nF	Z 25V
CT204	70041468	Cap, Chip	100nF	Z 25V
CT213	70041328	Cap, Chip	100nF	Z 25V
CT215	70041328	Cap, Chip	100nF	Z 25V
CV001	70041522	Cap, Electrolytic	47μF	M 10V
CV004	70041944	Cap, Chip	5pF	C
CV005	70041871	Cap, Chip	200pF	J 50V
CV010	70041096	Chip Jumper		
CV012	70041328	Cap, Chip	100nF	Z 25V
CV013	24797330	Cap, Electrolytic	33μF	M 50V
CV014	70041704	Cap, Chip	47nF	K 10V
CV015	70040493	Cap, Chip	10nF	K 50V
CV017	24636010	Cap, Electrolytic	1μF	M 50V
CV020	70040238	Cap, Ceramic, Chip	15pF	J 50V
CV021	70041655	Cap, Chip	15nF	K 50V
CV022	70041103	Cap, Chip	33pF	J 50V
CV023	70041699	Cap, Chip	100nF	K
CV024	70041928	Cap, Chip	470nF	Z
CV025	70041472	Cap, Chip	1nF	K 50V
CV026	70041699	Cap, Chip	100nF	K
CV030	24092178	Cap, Chip	0.1μF	K 25V
CV031	70041655	Cap, Chip	15nF	K 50V
CV032	70041156	Cap, Chip	330nF	Z 25V
CV033	24285103	Cap, Chip	0.01μF	K 50V
CV035	70041328	Cap, Chip	100nF	Z 25V
CV036	70041623	Cap, Chip	330nF	K
CV038	70041530	Cap, Chip	330nF	Z 16V
CV039	70041530	Cap, Chip	330nF	Z 16V
CV040	70041328	Cap, Chip	100nF	Z 25V
CV041	70041328	Cap, Chip	100nF	Z 25V
CV043	70041156	Cap, Chip	330nF	Z 25V
CV044	70041624	Cap, Chip	470nF	Z
CV045	70041505	Cap, Electrolytic	3.3μF	M 50V
CV046	70041567	Cap, Chip	680nF	Z 16V
CV047	70041654	Cap, Chip	10nF	K 25V
CV048	24774180	Cap, Chip	18pF	J 50V
CV049	24774470	Cap, Chip	47pF	J 50V
CV050	70041641	Cap, Electrolytic	10μF	M 50V
CV051	70041654	Cap, Chip	10nF	K 25V
CV052	70041639	Cap, Electrolytic	4.7μF	M 16V
CV053	70041645	Cap, Electrolytic	10μF	M 35V
CV054	70041328	Cap, Chip	100nF	Z 25V
CV055	70040240	Cap, Ceramic, Chip	27pF	J 50V
CV056	70040264	Cap, Ceramic, Chip	180pF	J 50V
CV057	70041522	Cap, Electrolytic	47μF	M 10V
CV058	70041657	Cap, Chip	22nF	K 25V
CV070	70041328	Cap, Chip	100nF	Z 25V
CV071	24774820	Cap, Chip	82pF	J 50V
CV072	70041328	Cap, Chip	100nF	Z 25V
CV073	70041328	Cap, Chip	100nF	Z 25V
CV074	70041856	Cap, Chip	220nF	Z
CV075	70041328	Cap, Chip	100nF	Z 25V
CV076	70041522	Cap, Electrolytic	47μF	M 10V
CV079	70041328	Cap, Chip	100nF	Z 25V
CV080	24872222	Res, Chip	2.2kΩ	J 1/16W
CV082	24774100	Cap, Chip	10pF	D 50V
CV090	70041093	Chip Jumper		
CV091	70041328	Cap, Chip	100nF	Z 25V
CV099	70041328	Cap, Chip	100nF	Z 25V
CV100	70040267	Cap, Ceramic, Chip	4.7nF	K 50V
CV101	70041654	Cap, Chip	10nF	K 25V
CV102	70041328	Cap, Chip	100nF	Z 25V
CV103	70041241	Cap, Electrolytic	47μF	M 16V
CV106	70041373	Cap, Chip	56pF	J 50V
CV107	70041328	Cap, Chip	100nF	Z 25V
CV108	70041529	Cap, Chip	1μF	Z 16V
CV110	70040228	Cap, Ceramic, Chip	22pF	J 50V
CV111	70041654	Cap, Chip	10nF	K 25V
CV112	70041650	Cap, Chip	8pF	D
CV113	24774270	Cap, Chip	27pF	J 50V
CV114	24285103	Cap, Chip	0.01μF	K 50V
CV115	70041654	Cap, Chip	10nF	K 25V
CV116	70041654	Cap, Chip	10nF	K 25V
CV117	70041328	Cap, Chip	100nF	Z 25V
CV118	70041328	Cap, Chip	100nF	Z 25V
CV122	70041657	Cap, Chip	22nF	K 25V
CV131	70041704	Cap, Chip	47nF	K 10V
CV132	70040257	Cap, Ceramic, Chip	15pF	J 50V
CV133	70040261	Cap, Ceramic, Chip	68pF	J 50V
CV136	70041725	Cap, Chip	0.022μF	K 50V
CV170	70041654	Cap, Chip	10nF	K 25V
CV171	70041967	Cap, Chip	0.027μF	J 50V
CW001	70040530	Cap, Electrolytic	100μF	M 16V
CW005	24797100	Cap, Electrolytic	10μF	M 50V
CW006	70040738	Cap, Electrolytic	4.7μF	25V
CW007	70041533	Cap, Chip	47nF	K 50V
CZ003	70041500	Cap, Electrolytic	47μF	M 50V
CZ005	70040980	Cap, Chip	100pF	J 50V
CZ007	70040980	Cap, Chip	100pF	J 50V
CZ008	70040980	Cap, Chip	100pF	J 50V
CZ014	70041241	Cap, Electrolytic	47μF	M 16V
CZ015	70041500	Cap, Electrolytic	47μF	M 50V
CZ021	70041631	Cap, Chip	22nF	K 50V
CZ030	24794101	Cap, Electrolytic	100μF	M 16V
CZ033	24794101	Cap, Electrolytic	100μF	M 16V
CZ055	70041652	Cap, Chip	910pF	J 50V
CZ056	70040246	Cap, Ceramic, Chip	270pF	J 50V
PT101	24093962	Cap, Variable	20pF	
		- RESISTORS -		
RC112	70041096	Chip Jumper		
RC116	70041096	Chip Jumper		
RC118	24872102	Res, Chip	1kΩ	J 1/16W
RG009	24872222	Res, Chip	2.2kΩ	J 1/16W
RG010	70041068	Res, Carbon	2.2kΩ	J
RG011	24872221	Res, Chip	220Ω	J 1/16W
RG012	24872221	Res, Chip	220Ω	J 1/16W
RS002	24871100	Res, Chip	10Ω	J 1/8W
RS003	70040362	Res, Chip	33kΩ	J 1/16W
RS004	24872221	Res, Chip	220Ω	J 1/16W
RS005	70040895	Res, Carbon	820Ω	J 1/4W
RS006	24872334	Res, Chip	330kΩ	J 1/16W
RS007	70040895	Res, Carbon	820Ω	J 1/4W
RS008	70040571	Res, Chip	12kΩ	J 1/16W
RS010	70041138	Res, Chip	5.6kΩ	J 1/10W
RS011	70041800	Res, Chip	4.3kΩ	J 1/10W
RS012	70040374	Res, Chip	8.2kΩ	J 1/16W
RS013	24872393	Res, Chip	39kΩ	J 1/16W
RS014	70041676	Res, Chip	2.2MΩ	K 1/10W
RS015	70040336	Res, Chip	68kΩ	J 1/16W
RS016	24871822	Res, Chip	8.2kΩ	J 1/8W
RS017	24872102	Res, Chip	1kΩ	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RS019	70011728	Res,Chip	20kΩ	J
RS021	70040786	Res,Carbon	33kΩ	J 1/4W
RS022	70040701	Res,Carbon	100Ω	J 1/4W
RS023	70041924	Res,Chip	430Ω	J 1/10W
RS025	24872221	Res,Chip	220Ω	J 1/16W
RS026	70041093	Chip Jumper		
RS029	24872473	Res,Chip	47kΩ	J 1/16W
RS030	70041176	Res,Chip	4.7Ω	J 1/16W
RS031	24872472	Res,Chip	4.7kΩ	J 1/16W
RS036	24871103	Res,Chip	10kΩ	J 1/8W
RS039	24871472	Res,Chip	4.7kΩ	J 1/8W
RS040	24872472	Res,Chip	4.7kΩ	J 1/16W
⚠RS041	70041671	Res,Fusible	18Ω	J 0.3W
RS042	70041096	Chip Jumper		
RS130	24872104	Res,Chip	100kΩ	J 1/16W
RT016	24871472	Res,Chip	4.7kΩ	J 1/8W
RT017	24871821	Res,Chip	820Ω	J 1/8W
RT024	24871103	Res,Chip	10kΩ	J 1/8W
RT075	24872222	Res,Chip	2.2kΩ	J 1/16W
RT100	24871201	Res,Chip	200Ω	J 1/8W
RT101	24871201	Res,Chip	200Ω	J 1/8W
RT103	24872472	Res,Chip	4.7kΩ	J 1/16W
RT105	24872563	Res,Chip	56kΩ	J 1/16W
RT106	24872182	Res,Chip	1.8kΩ	J 1/16W
RT107	24871182	Res,Chip	1.8kΩ	J 1/8W
RT108	24872563	Res,Chip	56kΩ	J 1/16W
RT109	24872471	Res,Chip	470Ω	J 1/16W
RT110	70040370	Res,Chip	680kΩ	J 1/16W
RT111	70041554	Res,Chip	4.7MΩ	K 1/16W
RT112	70041387	Res,Chip	220kΩ	J 1/10W
RT113	70041554	Res,Chip	4.7MΩ	K 1/16W
RT116	24872101	Res,Chip	100Ω	J 1/16W
RT117	70040891	Res,Carbon	470Ω	J 0.2W
RT124	24872821	Res,Chip	820Ω	J 1/16W
RT125	24871181	Res,Chip	180Ω	J 1/8W
RT126	24871562	Res,Chip	5.6kΩ	J 1/8W
RT127	24871562	Res,Chip	5.6kΩ	J 1/8W
RT128	24871273	Res,Chip	27kΩ	J 1/8W
RT129	70040784	Res,Carbon	22kΩ	J 1/4W
RT130	24871472	Res,Chip	4.7kΩ	J 1/8W
RT131	24871221	Res,Chip	220Ω	J 1/8W
RT132	24871229	Res,Chip	2.2Ω	J 1/8W
RT133	24871229	Res,Chip	2.2Ω	J 1/8W
⚠RT135	70041236	Res,Fusible	1Ω	J 0.4W
RT138	70040106	Res,Carbon	10kΩ	J 1/4W
RT139	70040852	Res,Carbon	10kΩ	J 1/4W
RT145	70040106	Res,Carbon	10kΩ	J 1/4W
RT148	24871102	Res,Chip	1kΩ	J 1/8W
RT149	24871182	Res,Chip	1.8kΩ	J 1/8W
RT150	24871472	Res,Chip	4.7kΩ	J 1/8W
RT151	24871472	Res,Chip	4.7kΩ	J 1/8W
RT152	24872472	Res,Chip	4.7kΩ	J 1/16W
RT153	24871102	Res,Chip	1kΩ	J 1/8W
RT155	24871473	Res,Chip	47kΩ	J 1/8W
RT156	24871473	Res,Chip	47kΩ	J 1/8W
RT159	24871222	Res,Chip	2.2kΩ	J 1/8W
RT160	24872102	Res,Chip	1kΩ	J 1/16W
RT162	24871103	Res,Chip	10kΩ	J 1/8W
RT163	70041659	Res,Carbon	220Ω	J 1/4W
RT164	24871103	Res,Chip	10kΩ	J 1/8W
RT165	70041093	Chip Jumper		
RT166	70041659	Res,Carbon	220Ω	J 1/4W
RT167	24872103	Res,Chip	10kΩ	J 1/16W
RT168	24872473	Res,Chip	47kΩ	J 1/16W
RT169	70041879	Res,Chip	30kΩ	J 1/10W
RT170	24871181	Res,Chip	180Ω	J 1/8W
RT171	24871151	Res,Chip	150Ω	J 1/8W
RT176	24871103	Res,Chip	10kΩ	J 1/8W
RT177	24872222	Res,Chip	2.2kΩ	J 1/16W
RT178	24872222	Res,Chip	2.2kΩ	J 1/16W
RT179	70041677	Res,Chip	2.2kΩ	G 1/10W
RT180	70041677	Res,Chip	2.2kΩ	G 1/10W
RT181	24871103	Res,Chip	10kΩ	J 1/8W
RT182	70041675	Res,Chip	16kΩ	J 1/8W
RT183	70040371	Res,Chip	2.2kΩ	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RT184	70040679	Res,Chip	2.2kΩ	J 1/8W
RT200	24871222	Res,Chip	2.2kΩ	J 1/8W
RT201	24871222	Res,Chip	2.2kΩ	J 1/8W
RT202	24871222	Res,Chip	2.2kΩ	J 1/8W
RT203	70040103	Res,Carbon	1kΩ	J 1/4W
RT215	70040371	Res,Chip	2.2kΩ	J 1/16W
RV001	24872105	Res,Chip	1MΩ	J 1/16W
RV004	24872102	Res,Chip	1kΩ	J 1/16W
RV005	70041783	Res,Chip	5.1kΩ	J 1/10W
RV011	70041096	Chip Jumper		
RV019	24872680	Res,Chip	68Ω	J 1/16W
RV022	24872222	Res,Chip	2.2kΩ	J 1/16W
RV023	24872102	Res,Chip	1kΩ	J 1/16W
RV025	24872104	Res,Chip	100kΩ	J 1/16W
RV026	70040363	Res,Chip	47kΩ	J 1/16W
RV028	24872223	Res,Chip	22kΩ	J 1/16W
RV030	70041173	Res,Chip	100kΩ	J 1/10W
RV032	24872102	Res,Chip	1kΩ	J 1/16W
RV034	24872473	Res,Chip	47kΩ	J 1/16W
RV035	70040962	Res,Carbon	47kΩ	J 1/4W
RV036	24872473	Res,Chip	47kΩ	J 1/16W
RV037	24872473	Res,Chip	47kΩ	J 1/16W
RV038	24872472	Res,Chip	4.7kΩ	J 1/16W
RV039	24872103	Res,Chip	10kΩ	J 1/16W
RV040	24872473	Res,Chip	47kΩ	J 1/16W
RV043	24872472	Res,Chip	4.7kΩ	J 1/16W
RV044	24872102	Res,Chip	1kΩ	J 1/16W
RV045	24872105	Res,Chip	1MΩ	J 1/16W
RV046	24872105	Res,Chip	1MΩ	J 1/16W
RV048	24872103	Res,Chip	10kΩ	J 1/16W
RV050	24872681	Res,Chip	680Ω	J 1/16W
RV052	24872102	Res,Chip	1kΩ	J 1/16W
RV053	24871821	Res,Chip	820Ω	J 1/8W
RV054	24872102	Res,Chip	1kΩ	J 1/16W
RV055	24872621	Res,Chip	620Ω	J 1/16W
RV056	24872561	Res,Chip	560Ω	J 1/16W
RV070	70041093	Chip Jumper		
RV071	70040339	Res,Chip	330Ω	J 1/16W
RV074	24872222	Res,Chip	2.2kΩ	J 1/16W
RV080	70041096	Chip Jumper		
RV082	70041093	Chip Jumper		
RV083	70041096	Chip Jumper		
RV101	24872821	Res,Chip	820Ω	J 1/16W
RV102	70041694	Res,Chip	7.5kΩ	J 1/16W
RV103	24872472	Res,Chip	4.7kΩ	J 1/16W
RV104	70041093	Chip Jumper		
RV105	24872102	Res,Chip	1kΩ	J 1/16W
RV106	24872471	Res,Chip	470Ω	J 1/16W
RV107	24872122	Res,Chip	1.2kΩ	J 1/16W
RV108	70040571	Res,Chip	12kΩ	J 1/16W
RV109	24872223	Res,Chip	22kΩ	J 1/16W
RV110	24872331	Res,Chip	330Ω	J 1/16W
RV111	24871272	Res,Chip	2.7kΩ	J 1/8W
RV114	24872823	Res,Chip	82kΩ	J 1/16W
RV115	24872223	Res,Chip	22kΩ	J 1/16W
RV116	24872471	Res,Chip	470Ω	J 1/16W
RV118	24872102	Res,Chip	1kΩ	J 1/16W
RV119	70041096	Chip Jumper		
RV120	24872823	Res,Chip	82kΩ	J 1/16W
RV124	70040920	Res,Carbon	1.5kΩ	J 1/4W
RV128	70041176	Res,Chip	4.7Ω	J 1/16W
RV129	24872681	Res,Chip	680Ω	J 1/16W
RV130	70040103	Res,Carbon	1kΩ	J 1/4W
RV131	24872182	Res,Chip	1.8kΩ	J 1/16W
RV132	70040133	Res,Chip	1kΩ	J 1/8W
RV133	70040373	Res,Chip	4.7kΩ	J 1/16W
RV134	70040132	Res,Chip	22kΩ	J 1/8W
RV135	70040135	Res,Chip	12kΩ	J 1/8W
RV136	70040364	Res,Chip	56kΩ	J 1/16W
RV137	70040366	Res,Chip	82kΩ	J 1/16W
RV138	70040367	Res,Chip	120kΩ	J 1/16W
RV139	70041173	Res,Chip	100kΩ	J 1/10W
RV152	24872105	Res,Chip	1MΩ	J 1/16W
RV211	24872683	Res,Chip	68kΩ	J 1/16W
RV902	70040391	Chip Jumper		

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RW001	70040118	Res, Carbon	4.7kΩ	J 1/4W
RW002	24872122	Res, Chip	1.2kΩ	J 1/16W
RW005	24871223	Res, Chip	22kΩ	J 1/8W
RW006	24872472	Res, Chip	4.7kΩ	J 1/16W
RW008	24871103	Res, Chip	10kΩ	J 1/8W
RW009	24871103	Res, Chip	10kΩ	J 1/8W
RW010	24871103	Res, Chip	10kΩ	J 1/8W
RW011	24871103	Res, Chip	10kΩ	J 1/8W
⚠RW012	70041074	Res, Fusible	27Ω	J 0.3W
RW019	24871152	Res, Chip	1.5kΩ	J 1/8W
RW020	24871152	Res, Chip	1.5kΩ	J 1/8W
⚠RW021	70041672	Res, Fusible	5.6Ω	J 0.3W
RW024	70040703	Res, Carbon	27kΩ	J 1/4W
RW025	70041137	Res, Chip	3.9kΩ	J 1/10W
RW027	24871339	Res, Chip	3.3Ω	J 1/8W
RW028	24871339	Res, Chip	3.3Ω	J 1/8W
RW029	24871339	Res, Chip	3.3Ω	J 1/8W
RW030	24871332	Res, Chip	3.3kΩ	J 1/8W
RZ001	70040118	Res, Carbon	4.7kΩ	J 1/4W
RZ007	24872221	Res, Chip	220Ω	J 1/16W
RZ008	24871221	Res, Chip	220Ω	J 1/8W
RZ015	70040103	Res, Carbon	1kΩ	J 1/4W
RZ030	24872911	Res, Chip	910Ω	J 1/16W
RZ031	24872102	Res, Chip	1kΩ	J 1/16W
RZ035	70041096	Chip Jumper		
RZ037	70040355	Res, Chip	1.5kΩ	J 1/16W
RZ050	24872681	Res, Chip	680Ω	J 1/16W
RZ051	70041945	Res, Chip	130Ω	J 1/10W
RZ052	24872471	Res, Chip	470Ω	J 1/16W
RZ053	70040570	Res, Chip	470Ω	J 1/16W
RZ054	70040103	Res, Carbon	1kΩ	J 1/4W
RZ055	24872102	Res, Chip	1kΩ	J 1/16W
RZ056	24872471	Res, Chip	470Ω	J 1/16W
RZ058	24872472	Res, Chip	4.7kΩ	J 1/16W
RZ065	70041660	Res, Carbon	100Ω	J 0.43W
RZ066	70041658	Res, Carbon	82Ω	J 1/4W
JS007	70041093	Chip Jumper		
JS009	70041096	Chip Jumper		
JS012	70041093	Chip Jumper		
JS017	70041093	Chip Jumper		
JS019	70041093	Chip Jumper		
JS020	70041093	Chip Jumper		
JS021	70041093	Chip Jumper		
JS026	70041093	Chip Jumper		
JS027	70041096	Chip Jumper		
JS037	70041093	Chip Jumper		
JS039	70041093	Chip Jumper		
JS042	70041096	Chip Jumper		
JS051	70041093	Chip Jumper		
JS104	70041096	Chip Jumper		
JS109	70041093	Chip Jumper		
JS122	70041093	Chip Jumper		
JS123	70041093	Chip Jumper		
JS125	70041096	Chip Jumper		
JT004	70041093	Chip Jumper		
JT006	70041093	Chip Jumper		
JT009	70041096	Chip Jumper		
JT018	70041093	Chip Jumper		
JT032	70041093	Chip Jumper		
JT044	70041093	Chip Jumper		
JT063	70040550	Res, Carbon	1.8kΩ	J 1/4W
JT064	70040550	Res, Carbon	1.8kΩ	J 1/4W
JT070	70041096	Chip Jumper		
JT083	70041093	Chip Jumper		
JT099	70041093	Chip Jumper		
JT111	70041093	Chip Jumper		
JT115	70041093	Chip Jumper		
JT127	70041093	Chip Jumper		
JT129	70041093	Chip Jumper		
JT130	70041093	Chip Jumper		
JT155	70041093	Chip Jumper		
JT156	70041093	Chip Jumper		
JT164	70041093	Chip Jumper		
JT169	70041093	Chip Jumper		
JT172	70041093	Chip Jumper		

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
JT176	70041093	Chip Jumper	
JT182	70041093	Chip Jumper	
JT183	70041093	Chip Jumper	
JT185	70041093	Chip Jumper	
JT192	70041093	Chip Jumper	
JT206	70041093	Chip Jumper	
JT207	70041093	Chip Jumper	
JT214	70041093	Chip Jumper	
JT226	70041096	Chip Jumper	
JV004	70041096	Chip Jumper	
JV005	70041093	Chip Jumper	
JV010	70041093	Chip Jumper	
JV016	70041093	Chip Jumper	
JV019	70041096	Chip Jumper	
JV024	70040391	Chip Jumper	
JV026	70041096	Chip Jumper	
JV040	70041096	Chip Jumper	
JV044	70041096	Chip Jumper	
JV049	70041093	Chip Jumper	
JV054	70041093	Chip Jumper	
JV100	70041093	Chip Jumper	
JV130	70041093	Chip Jumper	
JV139	70041093	Chip Jumper	
JV140	70041093	Chip Jumper	
JV142	70041096	Chip Jumper	
JV145	70041096	Chip Jumper	
JV151	70040391	Chip Jumper	
JV204	70041093	Chip Jumper	
JV205	70041096	Chip Jumper	
JW004	70041096	Chip Jumper	
JW006	70041093	Chip Jumper	
JW009	70041093	Chip Jumper	
JW016	70041093	Chip Jumper	
JW017	70041093	Chip Jumper	
JW030	70041096	Chip Jumper	
JZ003	70041093	Chip Jumper	
JZ011	70041093	Chip Jumper	
JZ012	70041093	Chip Jumper	
JZ029	70041093	Chip Jumper	
JZ040	70041093	Chip Jumper	
JZ042	70041096	Chip Jumper	
JZ045	70041093	Chip Jumper	
JZ054	70041093	Chip Jumper	
JZ069	70041093	Chip Jumper	
JZ076	70041096	Chip Jumper	
PS034	24066742	Res, Variable	10kΩ
		- MISCELLANEOUS -	
0010M	70011844	Tuner	
0020M	70011947	IF Module	
BT006	70011830	Connector	
FZ051	70011261	Filter	5.5MHz
GT101	70011793	Photo Interrupter	GP1S562
GT102	70011793	Photo Interrupter	GP1S562
GT105	70011828	Hall Sensor	HW300B
GT10A	70051136	LED Holder	
MT001	70031317	Stator	
QT100	70010116	Crystal, 32kHz	
QT101	70012167	Crystal	16MHz
QT102	70012188	Crystal	17.734MHz
QV018	70012051	Crystal	4.43MHz
ST002	70011826	Switch, Push	
■0030M	70090524	P C Board Assy	Terminal
		- INTEGRATED CIRCUITS -	
IX001	70011881	IC	STV6400
IX020	70011975	IC	MC14052/BCP
IX040	70119727	IC	MC14053BCP
		- TRANSISTORS -	
TG029	23114454	Transistor	DTC144E
TG030	23114454	Transistor	DTC144E
TX002	70010134	Transistor	BC548B
		- DIODES -	
DG020	70010153	Diode	1N4148
DG034	70010153	Diode	1N4148
		- COILS -	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
LX001	70010642	Coil,Peaking		
LX002	70011954	Coil,Peaking		
LX003	70012094	Coil,Peaking		
		- CAPACITORS -		
CX001	24203470	Cap,Electrolytic	47μF	M 16V
CX002	70040052	Cap,Plastic	100nF	M 63V
CX003	70040052	Cap,Plastic	100nF	M 63V
CX004	70040052	Cap,Plastic	100nF	M 63V
CX005	70040052	Cap,Plastic	100nF	M 63V
CX006	70040052	Cap,Plastic	100nF	M 63V
CX008	70040052	Cap,Plastic	100nF	M 63V
CX009	24203470	Cap,Electrolytic	47μF	M 16V
CX010	70040052	Cap,Plastic	100nF	M 63V
CX016	24203470	Cap,Electrolytic	47μF	M 16V
CX017	70040052	Cap,Plastic	100nF	M 63V
CX018	24473470	Cap,Ceramic	47pF	J 50V
CX023	24436271	Cap,Ceramic	270pF	J 50V
CX050	70040738	Cap,Electrolytic	4.7μF	25V
CX051	24633220	Cap,Electrolytic	22μF	M 16V
CX055	24203470	Cap,Electrolytic	47μF	M 16V
CX056	70040052	Cap,Plastic	100nF	M 63V
CX057	70040500	Cap,Plastic	8.2nF	J 63V
CX061	70040300	Cap,Ceramic	1nF	K 50V
CX070	24206479	Cap,Electrolytic	4.7μF	M 50V
CX071	70040530	Cap,Electrolytic	100μF	M 16V
CX072	24630852	Cap,Electrolytic	22μF	M 16V
CX073	70040500	Cap,Plastic	8.2nF	J 63V
CX091	70040300	Cap,Ceramic	1nF	K 50V
CX100	24636229	Cap,Electrolytic	2.2μF	M 50V
		- RESISTORS -		
RG020	70040963	Res,Carbon	8.2kΩ	J 1/4W
RG021	70041665	Res,Carbon	5.6kΩ	J 1/4W
RG030	70040844	Res,Carbon	1kΩ	J 1/4W
RG031	70040852	Res,Carbon	10kΩ	J 1/4W
RG032	70040846	Res,Carbon	820Ω	J 1/4W
RG033	70040846	Res,Carbon	820Ω	J 1/4W
RG034	70040963	Res,Carbon	8.2kΩ	J 1/4W
RG035	70041665	Res,Carbon	5.6kΩ	J 1/4W
RG057	70040845	Res,Carbon	680Ω	J 1/4W
RX002	70040842	Res,Carbon	470Ω	J
RX018	70040839	Res,Carbon	100Ω	J 1/4W
RX021	70040844	Res,Carbon	1kΩ	J 1/4W
RX023	70040963	Res,Carbon	8.2kΩ	J 1/4W
RX024	70040852	Res,Carbon	10kΩ	J 1/4W
RX025	70040848	Res,Carbon	100kΩ	J
RX033	70040848	Res,Carbon	100kΩ	J
RX050	70041666	Res,Carbon	470kΩ	J 1/4W
RX051	70041664	Res,Carbon	220kΩ	J 1/4W
RX053	70040844	Res,Carbon	1kΩ	J 1/4W
RX054	70040848	Res,Carbon	100kΩ	J
RX060	70041665	Res,Carbon	5.6kΩ	J 1/4W
RX061	70041665	Res,Carbon	5.6kΩ	J 1/4W
RX070	70041664	Res,Carbon	220kΩ	J 1/4W
RX071	70041666	Res,Carbon	470kΩ	J 1/4W
RX072	70040844	Res,Carbon	1kΩ	J 1/4W
RX073	70040845	Res,Carbon	680Ω	J 1/4W
RX080	70041663	Res,Carbon	75Ω	J 1/4W
RX081	70040838	Res,Carbon	68Ω	J 1/4W
RX089	70040845	Res,Carbon	680Ω	J 1/4W
RX090	70041665	Res,Carbon	5.6kΩ	J 1/4W
RX091	70041665	Res,Carbon	5.6kΩ	J 1/4W
RX092	70041663	Res,Carbon	75Ω	J 1/4W
RX093	70040838	Res,Carbon	68Ω	J 1/4W
RX094	70040848	Res,Carbon	100kΩ	J
RX095	70040848	Res,Carbon	100kΩ	J
RX096	70040848	Res,Carbon	100kΩ	J
RX097	70040845	Res,Carbon	680Ω	J 1/4W
RX100	70040850	Res,Carbon	2.7kΩ	J
RX212	70041667	Res,Carbon	12kΩ	J 1/4W
RX213	70040811	Res,Carbon	3.3kΩ	J
		- MISCELLANEOUS -		
BX01A	70011976	Wire		
■0043M	70090586	P C Board Assy	CCD Amp	
		- TRANSISTORS -		

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
TV092	70010150	Transistor	BC848B	
TV093	70010150	Transistor	BC848B	
		- COILS -		
LV092	70011848	Coil,Peaking		
		- CAPACITORS -		
CV092	24783330	Cap,Chip	33pF	J 50V
CV094	24092178	Cap,Chip	0.1μF	K 25V
CV109	70041654	Cap,Chip	10nF	K 25V
		- RESISTORS -		
RV092	24872471	Res,Chip	470Ω	J 1/16W
RV093	24872222	Res,Chip	2.2kΩ	J 1/16W
RV094	24872681	Res,Chip	680Ω	J 1/16W
RV095	24872101	Res,Chip	100Ω	J 1/16W
RV096	24872561	Res,Chip	560Ω	J 1/16W
■0042M	70091919	P C Board Assy	OSD Mix	
		- TRANSISTORS -		
TV125	70010150	Transistor	BC848B	
TV140	70010947	Transistor	BC858	
TV141	70010947	Transistor	BC858	
TV142	70010150	Transistor	BC848B	
TV143	70010150	Transistor	BC848B	
TV144	70010947	Transistor	BC858	
TV145	70010150	Transistor	BC848B	
		- COILS -		
LV124	23289270	Coil,Peaking	TRF4270AF	
LV125	23289270	Coil,Peaking	TRF4270AF	
LV140	70012095	Coil,Peaking		
		- CAPACITORS -		
CV124	24774100	Cap,Chip	10pF	D 50V
CV125	24783399	Cap,Chip	3.9pF	
CV126	24774330	Cap,Chip	33pF	J 50V
CV127	70041650	Cap,Chip	8pF	D
CV128	24774180	Cap,Chip	18pF	J 50V
CV140	24783330	Cap,Chip	33pF	J 50V
CV141	24092178	Cap,Chip	0.1μF	K 25V
CV142	70041183	Cap,Electrolytic	47μF	M 16V
CV143	70041188	Cap,Electrolytic	10μF	M 16V
		- RESISTORS -		
RV125	70041096	Chip Jumper		
RV126	24872102	Res,Chip	1kΩ	J 1/16W
RV140	24872102	Res,Chip	1kΩ	J 1/16W
RV141	24872102	Res,Chip	1kΩ	J 1/16W
RV142	24872102	Res,Chip	1kΩ	J 1/16W
RV143	24872103	Res,Chip	10kΩ	J 1/16W
RV144	24872272	Res,Chip	2.7kΩ	J 1/16W
RV145	24872222	Res,Chip	2.2kΩ	J 1/16W
RV146	24872333	Res,Chip	33kΩ	J 1/16W
RV147	24872103	Res,Chip	10kΩ	J 1/16W
RV148	24872102	Res,Chip	1kΩ	J 1/16W
RV149	24872391	Res,Chip	390Ω	J 1/16W
RV151	24872682	Res,Chip	6.8kΩ	J 1/16W
RV152	24872331	Res,Chip	330Ω	J 1/16W
RV153	24872182	Res,Chip	1.8kΩ	J 1/16W
RV154	24872223	Res,Chip	22kΩ	J 1/16W
JV161	70041093	Chip Jumper		
■0040M	70090680	P C Board Assy	PBEQ	
		- TRANSISTORS -		
TV006	70010150	Transistor	BC848B	
TV007	70010150	Transistor	BC848B	
TV008	70010947	Transistor	BC858	
TV010	70010150	Transistor	BC848B	
TV121	70010942	Transistor	BC848	
TV123	70010150	Transistor	BC848B	
		- COILS -		
LV006	70012096	Coil,Peaking		
LV037	70012095	Coil,Peaking		
LV121	70011452	Coil,Peaking		
LV122	70012095	Coil,Peaking		
		- CAPACITORS -		
CV006	70041651	Cap,Chip	560pF	J 50V
CV007	24774101	Cap,Chip	100pF	J 50V
CV008	70041853	Cap,Electrolytic	10μF	M 16V
CV011	70041657	Cap,Chip	22nF	K 25V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CV029	24783680	Cap,Chip	68pF	J 50V
CV037	70041326	Cap,Chip	56pF	J 50V
CV121	24783151	Cap,Chip	150pF	J 50V
CV130	70041855	Cap,Chip	22pF	J 50V
CV134	24774100	Cap,Chip	10pF	D 50V
CV135	24774070	Cap,Chip	7pF	D 50V
		- RESISTORS -		
RV006	24872152	Res,Chip	1.5kΩ	J 1/16W
RV007	24872271	Res,Chip	270Ω	J 1/16W
RV008	24872102	Res,Chip	1kΩ	J 1/16W
RV009	24872331	Res,Chip	330Ω	J 1/16W
RV014	24872101	Res,Chip	100Ω	J 1/16W
RV015	70040355	Res,Chip	1.5kΩ	J 1/16W
RV016	24872681	Res,Chip	680Ω	J 1/16W
RV018	24872681	Res,Chip	680Ω	J 1/16W
RV020	24872152	Res,Chip	1.5kΩ	J 1/16W
RV021	24872182	Res,Chip	1.8kΩ	J 1/16W
RV024	24872821	Res,Chip	820Ω	J 1/16W
RV121	70040686	Res,Chip	1.5kΩ	J 1/8W
RV150	24872222	Res,Chip	2.2kΩ	J 1/16W
		- MISCELLANEOUS -		
BV48A	23164506	Plug 2P		
■0041M	70091918	P C Board Assy	CHR DLY	
		- TRANSISTORS -		
TV002	A6004020	Transistor,Chip	RN1402	
TV060	70010947	Transistor	BC858	
TV061	70010150	Transistor	BC848B	
		- COILS -		
LV002	70011576	Coil,Peaking		
LV060	70012098	Coil,Peaking		
LV095	70011577	Coil,Peaking		
		- CAPACITORS -		
CV002	70041859	Cap,Chip	680pF	J 50V
CV028	70041241	Cap,Electrolytic	47µF	M 16V
CV060	24783121	Cap,Chip	120pF	J 50V
CV095	70041096	Chip Jumper		
CV096	24774330	Cap,Chip	33pF	J 50V
CV097	24774101	Cap,Chip	100pF	J 50V
		- RESISTORS -		
RV002	24872271	Res,Chip	270Ω	J 1/16W
RV060	24872102	Res,Chip	1kΩ	J 1/16W
RV061	24872821	Res,Chip	820Ω	J 1/16W
RV062	70041096	Chip Jumper		
RV063	24872101	Res,Chip	100Ω	J 1/16W
RV064	24872102	Res,Chip	1kΩ	J 1/16W
RV097	24872102	Res,Chip	1kΩ	J 1/16W
RV098	24872222	Res,Chip	2.2kΩ	J 1/16W
RV123	24872271	Res,Chip	270Ω	J 1/16W
JV160	70041096	Chip Jumper		
■0150M	70090494	P C Board Assy	Power	
		- INTEGRATED CIRCUITS -		
IP001	70011972	IC	U4614B	
IP002	70011699	IC	LM393N	
		- TRANSISTORS -		
TP001	70011962	Transistor,Chip	BUL310XI	
TP091	70011386	Transistor	2SA1020-Y	
		- DIODES -		
DP001	70012286	Diode	1N4007	
DP002	70012286	Diode	1N4007	
DP003	70012286	Diode	1N4007	
DP004	70012286	Diode	1N4007	
DP007	70012469	Diode	BA157	
DP008	70010817	Diode	1N4148	
DP009	70010817	Diode	1N4148	
DP041	70012469	Diode	BA157	
DP051	70011966	Diode	BAV20	
DP052	70011966	Diode	BAV20	
DP061	70011965	Diode	BA157	
DP071	70011966	Diode	BAV20	
DP080	70010417	Diode	1N5822	
DP093	70010817	Diode	1N4148	
DP094	70011286	Diode,Zener	ZPD5.6	
DP095	70010955	Diode	MUR115	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
		- COILS -		
⚠LP002	70011949	Line Filter		
LP01A	70011950	Line Filter		
LP051	70010922	Coil,Peaking		
LP071	23238916	Coil,Peaking	TRF4330AC	
LP081	70011955	Coil,Peaking		
LP091	70011952	Coil,Peaking		
		- CAPACITORS -		
⚠CP001	70040056	Cap,Plastic	100nF	M 275V
⚠CP002	70041047	Cap,Electrolytic	47µF	M 385V
⚠CP003	70041646	Cap,Ceramic	2.2nF	M 400V
CP004	70041370	Cap,Ceramic	100pF	K 1kV
CP005	24774100	Cap,Chip	10pF	D 50V
CP006	70041656	Cap,Chip	4.7nF	M 50V
CP007	24797100	Cap,Electrolytic	10µF	M 50V
CP008	70040725	Cap,Electrolytic	100µF	M 25V
CP009	70041532	Cap,Chip	330pF	J 50V
CP015	70041653	Cap,Chip	470pF	J 50V
CP020	70041532	Cap,Chip	330pF	J 50V
CP041	70040412	Cap,Electrolytic	220µF	M 10V
CP051	24636010	Cap,Electrolytic	1µF	M 50V
CP054	24797100	Cap,Electrolytic	10µF	M 50V
CP055	70040096	Cap,Ceramic	470pF	M 400V
CP056	70041633	Cap,Plastic	10nF	K 100V
CP061	70041638	Cap,Electrolytic	470µF	M 25V
CP071	70040772	Cap,Electrolytic	47µF	M 50V
CP072	70041562	Cap,Chip	100nF	Z 50V
CP073	70040096	Cap,Ceramic	470pF	M 400V
CP081	70041637	Cap,Electrolytic	1000µF	M 16V
CP082	70040772	Cap,Electrolytic	47µF	M 50V
CP092	70041638	Cap,Electrolytic	470µF	M 25V
CP093	70040772	Cap,Electrolytic	47µF	M 50V
CP094	70041328	Cap,Chip	100nF	Z 25V
CP095	70040980	Cap,Chip	100pF	J 50V
		- RESISTORS -		
RP001	24872103	Res,Chip	10kΩ	J 1/16W
RP002	24871153	Res,Chip	15kΩ	J 1/8W
RP003	24872823	Res,Chip	82kΩ	J 1/16W
RP004	24872223	Res,Chip	22kΩ	J 1/16W
RP005	24872223	Res,Chip	22kΩ	J 1/16W
RP006	24872223	Res,Chip	22kΩ	J 1/16W
RP007	24872223	Res,Chip	22kΩ	J 1/16W
RP008	24872473	Res,Chip	47kΩ	J 1/16W
RP009	24872104	Res,Chip	100kΩ	J 1/16W
RP010	24871153	Res,Chip	15kΩ	J 1/8W
RP011	24871153	Res,Chip	15kΩ	J 1/8W
RP012	24871153	Res,Chip	15kΩ	J 1/8W
RP013	70041917	Res,Chip	6.8kΩ	F 1/10W
RP014	24872222	Res,Chip	2.2kΩ	J 1/16W
RP015	70041678	Res,Chip	3.9Ω	K
RP016	24872330	Res,Chip	33Ω	J 1/16W
RP017	24871100	Res,Chip	10Ω	J 1/8W
⚠RP018	70041078	Res,Fusible	1.5Ω	J 0.3W
RP019	24871182	Res,Chip	1.8kΩ	J 1/8W
RP020	24872270	Res,Chip	27Ω	J 1/16W
⚠RP021	70041673	Res,Fusible	2.2kΩ	J 0.3W
RP022	24872104	Res,Chip	100kΩ	J 1/16W
RP026	24872473	Res,Chip	47kΩ	J 1/16W
RP027	24871153	Res,Chip	15kΩ	J 1/8W
RP028	24871153	Res,Chip	15kΩ	J 1/8W
RP031	24872393	Res,Chip	39kΩ	J 1/16W
RP032	24872752	Res,Chip	7.5kΩ	J 1/16W
⚠RP041	70041081	Res,Fusible	0.1Ω	F 0.4W
⚠RP042	70040456	Res,Fusible	10Ω	J
⚠RP051	70041116	Res,Fusible	39Ω	J 0.3W
RP052	24871102	Res,Chip	1kΩ	J 1/8W
RP053	24872473	Res,Chip	47kΩ	J 1/16W
RP054	24872822	Res,Chip	8.2kΩ	J 1/16W
RP057	24872333	Res,Chip	33kΩ	J 1/16W
RP061	24871682	Res,Chip	6.8kΩ	J 1/8W
RP062	24871682	Res,Chip	6.8kΩ	J 1/8W
RP063	24871682	Res,Chip	6.8kΩ	J 1/8W
⚠RP071	70040125	Res,Carbon	47Ω	J 0.3W
RP072	24871153	Res,Chip	15kΩ	J 1/8W
RP089	24872152	Res,Chip	1.5kΩ	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
⚠RP091	70041081	Res, Fusible	0.1Ω	F 0.4W
⚠RP092	70041670	Res, Fusible	120Ω	J 0.3W
RP093	24872682	Res, Chip	6.8kΩ	J 1/16W
RP094	70040895	Res, Carbon	820Ω	J 1/4W
RP095	24872393	Res, Chip	39kΩ	J 1/16W
RP096	70041880	Res, Chip	1kΩ	F 1/10W
RP097	70041679	Res, Chip	1.5kΩ	F 1/10W
JP001	70041093	Chip Jumper		
JP010	70041093	Chip Jumper		
JP011	70041093	Chip Jumper		
		- MISCELLANEOUS -		
⚠BP001	70011176	Inlet		
⚠FP001	70010445	Fuse, 1A, 250V		
FP01A	70010597	Fuse Holder		
⚠LP020	70011948	Power Transformer		
■0210M	70090831	P C Board Assy	KDB	
		- INTEGRATED CIRCUITS -		
ICK01	70012475	IC	TMP87CK70AF-6299	
		- TRANSISTORS -		
TK04	70010331	Transistor	BC847B	
		- DIODES -		
DK03	70011969	Diode, Zener	ZMM5.6V	
		- CAPACITORS -		
CK02	70041376	Cap, Chip	10nF	Z 50V
CK04	70041376	Cap, Chip	10nF	Z 50V
CK05	70041103	Cap, Chip	33pF	J 50V
CK06	70041103	Cap, Chip	33pF	J 50V
CK10	70040647	Cap, Electrolytic	47μF	M 10V
CK12	24814223	Cap, Chip	2200pF	Z 50V
CK20	70041376	Cap, Chip	10nF	Z 50V
		- RESISTORS -		
RK01	70041168	Res, Chip	15Ω	J 1/10W
RK02	70041168	Res, Chip	15Ω	J 1/10W
RK03	70041138	Res, Chip	5.6kΩ	J 1/10W
RK10	70040358	Res, Chip	10kΩ	J 1/16W
RK11	70040358	Res, Chip	10kΩ	J 1/16W
RK12	70040358	Res, Chip	10kΩ	J 1/16W
RK13	70040358	Res, Chip	10kΩ	J 1/16W
RK14	70040358	Res, Chip	10kΩ	J 1/16W
RK15	70040358	Res, Chip	10kΩ	J 1/16W
RK16	70040350	Res, Chip	220Ω	J 1/16W
RK17	70040358	Res, Chip	10kΩ	J 1/16W
RK18	70040358	Res, Chip	10kΩ	J 1/16W
RK19	70040350	Res, Chip	220Ω	J 1/16W
RK20	70040358	Res, Chip	10kΩ	J 1/16W
RK24	70040357	Res, Chip	22kΩ	J 1/16W
RK25	70040357	Res, Chip	22kΩ	J 1/16W
RK26	70011425	Res, Chip	3kΩ	
RK27	70011425	Res, Chip	3kΩ	
RK28	70011425	Res, Chip	3kΩ	
RK29	70011425	Res, Chip	3kΩ	
RK31	70041712	Res, Chip	9.1kΩ	J 1/10W
RK33.	70040358	Res, Chip	10kΩ	J 1/16W
RK34	70040358	Res, Chip	10kΩ	J 1/16W
RK35	70040358	Res, Chip	10kΩ	J 1/16W
RK36	70040358	Res, Chip	10kΩ	J 1/16W
RK38	70040354	Res, Chip	1kΩ	J 1/16W
RK39	70011426	Res, Chip	2kΩ	
RK40	70011425	Res, Chip	3kΩ	
RK41	70040357	Res, Chip	22kΩ	J 1/16W
RK42	70040357	Res, Chip	22kΩ	J 1/16W
RK43	70040358	Res, Chip	10kΩ	J 1/16W
RK48	70040354	Res, Chip	1kΩ	J 1/16W
RK50	70040354	Res, Chip	1kΩ	J 1/16W
RK51	70041709	Res, Chip	2.2kΩ	G 1/10W
RK53	70041389	Res, Chip	6.2kΩ	J 1/10W
RK54	70040357	Res, Chip	22kΩ	J 1/16W
RK55	70040358	Res, Chip	10kΩ	J 1/16W
RK65	70040354	Res, Chip	1kΩ	J 1/16W
RK67	70040373	Res, Chip	4.7kΩ	J 1/16W
RK76	70040391	Chip Jumper		
		- MISCELLANEOUS -		
GK01	70011971	FIP	6-MT-215GK	
IR01	70011443	F.U.	IR-9106A-D	
PK01A	70011839	Connector, 1.25mm		
QK01	70010937	Resonator	8MHz	
SK03	23344094	Push Switch		
SK04	23344094	Push Switch		
SK06	23344094	Push Switch		
SK07	23344094	Push Switch		
SK08	23344094	Push Switch		
SK10	23344094	Push Switch		
SK13	23344094	Push Switch		
SK14	23344094	Push Switch		
■0212M	70090877	P C Board Assy	FCB	
		- CAPACITORS -		
CK21	70041707	Cap, Chip	1nF	Z 50V
		- RESISTORS -		
RK49	70040374	Res, Chip	8.2kΩ	J 1/16W
RK72	70040354	Res, Chip	1kΩ	J 1/16W
RK75	70041441	Res, Chip	75Ω	J 1/10W
		- MISCELLANEOUS -		
P201	70011825	Phono Jack		
P701	70012041	Socket		
SK16	23344094	Push Switch		

SPECIFICATIONS

Format : VHS standard
Recording system : Rotary, 2-head helical scan system
Video heads : 4 heads
Video signal system : CCIR; 625 lines, 50 fields, PAL/SECAM colour signal
NTSC colour, 525 lines
Tape speed : SP : 23.39 mm/s (PAL/MESECAM) SP : 33.35 mm/s (NTSC)
LP : 11.70 mm/s (PAL/MESECAM) SLP : 11.12 mm/s (NTSC)
Recording time : SP : 240 minutes with E240 cassettes (PAL/MESECAM)
LP : 480 minutes with E240 cassettes (PAL/MESECAM)
Winding time : Approx. 110 seconds with E180 cassettes
Dimensions : 370 (W) × 89 (H) × 306.5 (D) mm
Mass : 4.0 kg
Operating temperature : +5 to +40°C
Operating humidity : Less than 80% RH
Mains power : 220 – 240 V AC, 50 Hz
Power consumption : 21 W (in operation)

CONNECTORS
Aerial input : 75 Ω coaxial
Aerial output : 75 Ω coaxial
Video input : AUDIO/VIDEO SCART socket, 1.0 V(p-p), 75 Ω
LINE IN 2 VIDEO Phono type jack, 1.0 V(p-p), 75 Ω
Audio input : AUDIO/VIDEO SCART socket, 308 mV(rms), more than 10 kΩ
LINE IN 2 AUDIO Phono type jack, 308 mV(rms), more than 47 kΩ
Video output : AUDIO/VIDEO SCART socket, 1.0 V(p-p), 75 Ω
Audio output : AUDIO/VIDEO SCART socket, 308 mV(rms), less than 1.0 kΩ

VIDEO
Signal-to-noise ratio : More than 43 dB (SP tape speed/PAL)

AUDIO
Signal-to-noise ratio : More than 42 dB (SP tape speed/PAL/normal mono)
Frequency range : 80 Hz to 10,000 Hz

TIMER
Clock : 24-hour digital indication
No. of events : 6 events 1 month

TUNER
System : Frequency synthesizer
Channel coverage : PAL SECAM B/G VHF: E2 – E12, A – H, H1, H2, R1 – R12
UHF: E21 – E69
CATV: X – Z, S1 – S41
SECAM D/K VHF: R1 – R12, A – H, H1, H2, E2 – E12
UHF: E21 – E69
CATV: X – Z, S1 – S41
RF converter : UHF channel 60 (53 – 67, adjustable)

Accessories : Aerial cable 1
Remote control unit 1
Batteries (R6) 2
Power cable 1

Designs and specifications are subject to change without notice.

TOSHIBA CORPORATION
1–1, SHIBAURA 1–CHOME, MINATO–KU, TOKYO 105–01, JAPAN